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## ORIGINAL ARTICLES

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### WHY WE INSIST ON EARLY ORTHODONTIA TREATMENT\*

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THE question of early treatment has been so well impressed upon my mind in an effort to secure and maintain the best possible results for the patient that I unhesitatingly confess that we are not making an endeavor, as probably we should, to educate the public to the urgent necessity of attending to irregular teeth and malformed arches early enough in a child's life.

The great majority of children that undergo orthodontic treatment, I believe you will agree, have erupted the majority of the permanent teeth. This being the case, the necessity of retention must be longer and more uncertain than if these children were treated when they retained the temporary teeth. Cases that do not show a tendency toward malformation until after the eruption of the permanent teeth can not be considered before, but most all cases show some evidence of abnormal development long before it is generally deemed advisable to subject the child to orthodontic treatment.

In going over the literature published on this subject a great deal is said in reference to Dento-Facial deformities, how to correct them, and the appliances employed to accomplish the end result.

This is essential as we can not select the patients and they must be treated regardless of the age, provided the work is beneficial to them.

However, it is quite noticeable how few cases are treated, at least illustrated in articles which are published showing any evidence of prevention. The young child less than seven or even five or six years of age can be handled with more ease, and decidedly better results can be gained with fewer appointments, and with less inconvenience due to a long and tedious retention.

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\*Read before the Alumni Society of the Dewey School of Orthodontia, April, 1920.

Every mother should be impressed with the necessity of reporting to the orthodontist at intervals, beginning with the eruption of the first temporary tooth and until such time as the child is assured of a perfectly formed arch with the teeth in correct position.

In my practice it is a pleasure to work for a number of children three, four and five years of age. The cooperation in these cases is the best and the retention is permanent.

Even though something prevents the proper eruption of the succeeding teeth, time has been saved and in the end the result is more satisfactory. I believe it is possible to fulfill the demand of science in orthodontic procedure, but this necessitates a close study and a more intimate knowledge of the habits of bone growth and of the tissues we are to operate upon, for let us remember that we can do nothing of permanent value by ourselves in our efforts at treatment, but only as we work in conjunction with Nature, studying her carefully, interpreting her wishes and intelligently assisting in her efforts of growth and development. Fortunately we have some wonderful chapters on histology and embryology, and a study of these must convince us of the most active period of development. The beginning and ending of calcification of the osseous tissue should be a guide in assisting Nature to build the parts in harmony and according to normal influences. If we are going to allow abnormal influences to intervene at three years of age and then correct them at twelve, our motives must be other than the importance of a full complement of teeth well arranged, and the very important part that each tooth plays in its relation to all the other teeth of the denture, that the denture may not only be in function most efficient, but that it may contribute its full part to the normal beauty and balance of the face according to the individual type, and also its normal part in the possibility of normal growth and development of the throat and nose, all of which are so essential to the health and growth of the individual. To recognize and combat abnormal influences in their early stages, means a great deal toward prevention, and while in itself not complete, will aid materially in treatments and shortens the period of retention.

We have many types of children to deal with and in varying stages of development, and our chances are great in studying the details which bring about the most satisfactory results. It also enables us to see the advantages and disadvantages of certain forms of appliances used when treating young children and the ones employed in older children, as, I believe you will all agree that very delicate appliances in the form of a lingual bar are sufficient in these young cases and in many instances adjusted only to the lower teeth. There are exceptional cases, however, which demand considerable root movement, even though in children quite young, and our appliances should be such as will best fulfill these demands. Anxious parents are extremely grateful for any assurance of a successful and permanent result, and it is only in the very young children that we can rely upon the result as being permanent without a great deal of discomfort to the patient in wearing retaining appliances over an indefinite period.

Cleanliness of the mouth must be observed during the treatment, and if the appliances are adjusted to temporary teeth as much as possible, we can avoid injury to the permanent teeth which will occur at least to a limited, if not to a very great, extent. The actual movement of teeth apparently seems to be accomplished in the older patients almost as readily as in younger children, but the retention in the older children of twelve to fourteen are never positive in my experience. I do not mean that the arches collapse entirely or that the teeth go back to their original position, but there is invariably some crowding of the anterior portion of the arch with one or two teeth slightly overlapping on the lingual or buccal inclination of some tooth. This condition of affairs spoils the effect of one's efforts toward an ideal result and lessens our hope of ever obtaining what is ultimately desired in these cases.

I was very much interested in an article read before the American Society of Orthodontists last year by Dr. Rogers on "Muscle Training and Its Relation to Orthodontia." In this paper he has to say, "It avails us little if we diligently seek to place one part of the human machine in harmonious relation and neglect that other part upon which permanent success depends."

A number of cases, no doubt, have failed in our hands even after prolonged retention, due to some inability on our part to recognize and correct abnormal influences which continue to act after the retainers are removed. It is often surprising, the cooperation received with these very young children and the instructions to these patients are more religiously carried out. The mothers assume the responsibility for seeing that the child keeps all the appointments and at this early age other allurements have not the attraction to keep the patient from the office, that they have at a later period in life. If the child is supplied with new and correct guiding impulses he is more apt to acquire an ability to combat abnormal influences, bringing about coordination of muscle groups and a complete control of their muscular mechanism. This must in time have a beneficial effect upon the parts we are directly concerned in and our teaching has accomplished what later would have been done by mechanical interference, with a useless waste of time and treasure. From the beginning, an individual is constantly surrounded by influences and environmental conditions that ultimately establish the character and development of the parts, and unless every precaution is observed against interference to health and harmony of functional adjustments, disease and disharmony will reign.

Every evidence of interference should be discouraged at its incipiency so as not to allow the parts to lose their normal activity in the slightest degree. The solution of our difficulties should, and I believe, will, soon be largely one of prevention; at least, we will be able to so govern the patients that they can be brought to realize the responsibility of their own destinies, to the extent of reporting to the orthodontist early enough, so that preventive measures may be adapted and the slight maldevelopment corrected. This would insure the parents of the necessity of looking after and caring for the temporary teeth, and the importance of their proper retention and loss, and the influence they bear in reference to the permanent set.

The tonsils and respiratory passages should be thoroughly examined for the detection of any probable interference from these sources, in fact, each of those forces which tend to produce inharmony of the parts should be eliminated and the attention of the parents called to their probable correction. We should lend to Nature a little assistance during her early developing period, at a time when the balance between normal and abnormal is nearly equal and the influences of an abnormal nature are fast making themselves apparent. The natural forces, such as cell metabolism, forces of the inclined planes, normal approximal contacts, harmony of shape, and sizes of the dental arches, atmospheric pressure, muscular pressure and such interferences as may be grouped under the heading of mental, respiratory, and postural may be encouraged to assume their natural attitude toward building the dental apparatus along natural lines and in keeping with the individual type. Greater efficiency in development and greater rewards from the standpoint of health must be the result of this early attention. The chances are just as great and as necessary or even more so in teaching children how to prevent abnormal influences as it is to teach them to overcome certain influences and even though the opportunity has not presented itself for such instructions until after some mechanical correction is found necessary, it will at least prevent further deflections in proportion to the degree of thoroughness in which the instructions have been given, and the sincerity in which they are received and carried out.

Experimenting with appliances for accomplishing the necessary tooth movement in these early cases is much more simplified and the gentle pressure necessary in assisting Nature by stimulating cellular activity can be neatly and physiologically applied in such a way as not to interfere with normal muscular activity, which must be recognized as a great factor in maintaining permanent results.

The displacement of the soft tissues during prolonged treatments has invariably resulted from the appliances that were used and they have exaggerated, if not actually produced influences, which did not exist at the beginning of the treatment and it is only through well directed efforts that these influences are ever overcome. Dr. E. A. Bogue has written and experimented a great deal along the line of early treatments and sets forth his conclusions in a paper which was published in the *Journal of the American Medical Association*, August 9, 1902, explaining that, "These operations would be almost or quite painless, that they may be accomplished with great rapidity if necessary, and with such certainty that absence through unexpected sickness or protracted journeyings need not interrupt the orderly progress of the work, provided sufficient notice be given to the operator, that the work may be accomplished with no perceptible detriment to the teeth." He reviews a number of very interesting experiments in an article, "Orthodontia of Deciduous Teeth," published in the *Dental Digest*, April, 1919, and says in part, "Another reason why orthodontia of the deciduous teeth should be practiced in civilized communities was brought very forcibly to my attention at the Hygienic Exposition in Dresden a few years ago, when I found that the average weight of the brain of the child at birth is 371 grams, at six years of age its average weight being 1,360 grams, and at nineteen years of age 1,400. A gain of 989 grams in the first six years, only 40 grams in the last



twelve." The masticatory apparatus is a living part of a living thing and is subject to the same general laws as are other parts of the organism and from these weights and other evidence at hand the most active period of development is during the first six years of a child's life. "The causes of malocclusion, to be intelligently comprehended, must be studied from the basis of the normal growth of the denture and its correlated parts. Most of the immediate causes are mechanical, yet whatever acts as a hindrance to nature in performing her delicate offices in the unfolding of the various tissues composing the dental apparatus during its growth will be operative as a cause in producing malocclusion."—*Angle*, 7th ed. 1907, p. 89.

Dr. Milo Hellman has written some splendid articles in reference to early treatments, one in particular which is beautifully illustrated showing at what an early age the tendency toward malformation can be detected and how readily influences of an abnormal nature make themselves evident and also the pernicious effects of these influences upon the developing masticatory apparatus.

**PRESIDENTIAL ADDRESS BEFORE THE ALUMNI SOCIETY  
OF THE DEWEY SCHOOL OF ORTHODONTIA,  
APRIL 1, 1920**

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I LIKE to feel that those of us who are gathered here are in true spirit, students. Many of us, perhaps, sacrifice a much needed vacation to attend. Others, yes, most of us, come at a definite sacrifice in terms of patients which must be turned away. But each year, we look forward with deep anticipation to these few days when, we may by intensive study and a closer companionship with others, constantly improve ourselves and through our individual improvement still more advance our great specialty to the high place it should and must occupy before the people.

Eight years ago I attended a banquet at the Baltimore Hotel in Kansas City, where a small band of men met together in the first session of the Alumni Society of the Dewey School of Orthodontia. Each year has witnessed a steady and healthy growth; growth in every case of members, who, in their communities are giving definite contributions to the cause of health and humanity. And, we who sat around the table at that banquet are proud that we have been even the smaller links of our big progressive body of today. And so we gain not alone from study and practice, but from mutual association with men, who in the active service in the field have been meeting and solving problems which in this annual forum may become the common knowledge of all. And so we come to teach and be taught, to lead and be led, that through this fine spirit of closest fellowship we bring to this society, not only our problems, but the sum total of our professional growth, our constructive thinking, which may serve to make our ideal for orthodontia the reality of tomorrow.

I shall in the course of my paper strive to make clear my viewpoint on four fundamental needs of the year.

1. Support of orthodontia through enthusiastic and broad-minded support of our society.
2. Proper relationship between dental science and orthodontia.
3. Provision for proper increase in our numbers, and
4. The development of a definite code of ethics for our profession.

I believe that the first need of every man here is that he recognize his personal responsibility to his specialty and that he must acquire through sympathetic understanding the spirit of sacrifice and hard work, contributed by the founders of orthodontia if he is to be at his best. No one of us can make the profession; no one can ruin it, but each one can advance its progress and in like degree each one can retard. There is in this sense a serious personal obligation which each must face. How many meetings, devoted to personal improvement

have I attended since I took my course? How many times have I thought to myself while working on a little patient, "Am I giving this child the newest and best care? Have I paid each year the dues I agreed to pay—dues which must be paid unless I wish to restrict the agencies maintained for our individual improvement? Have I contributed any new ideas to orthodontia? Am I a credit to my specialty?" We must face every one of these questions if we are to be a credit to our profession, if we are to be a credit to the men who have devoted their thoughts and energy, so that we might succeed. Many of us feel that because we have completed our course in school that we are perfect. This in itself speaks volumes in praise of the men who have created this confidence, but it is not true. Dr. Dewey has never told a man he was an orthodontist on completing his course; he has merely put down some large strong blocks for the foundation to each man as a beginning, and if it isn't in that man to go on and build squarely on those blocks, gaining his own strength each year, his castle in the air is going to tumble as surely as a balloon will fall without gas.

To be at our best we must know and appreciate a few of the struggles of the men who established our profession. A broad-minded understanding of their handicaps can not but give us added strength to fight our own battles. Two names stand out as living electric signs in our specialty—two men whom every one in dentistry and orthodontia can talk of with a degree of "I know them" spirit—they are Drs. Angle and Dewey.

When I knew that this address was to be written it did not occur to me to write an eulogy of these two men, but I have listened to many addresses before our societies and feel just as each man before me has felt, we simply can not pass by without saying just a little of what both heart and mind prompt us to say. True, there have been differences and each has his warm followers. The difference is not in spirit or enthusiasm or in loyalty to the cause—it is largely a matter of method and does not in one degree detract from the splendid service which each has rendered.

One of the most valued friendships I have ever possessed is the one I enjoy with Dr. Dewey. And differ as I assuredly would with Dr. Angle on many grounds and points, I can not but feel it a loss that I have not enjoyed his acquaintance also. The question often arises in my mind, "Where would orthodontia be today if it had not been for Dr. Angle?" It is to this man that we owe our beginning, just as we owe to George Washington the beginning of these United States. Washington, with the strength of mind and purpose, fought the opposition of the English and established what is today the strongest and most progressive nation of the world. So with Angle, who fought our early battles for us. He overcame the opposition of the medical men; he proved the practicing dentist without a special training incapable of the practice of orthodontia. He has proved that the foundation of our work could be laid out in eight weeks with a few students in each class to insure thorough work, and these graduates, students still, brought together each year for further study.

A second need which I believe we should face is a clear establishment of the relationship between orthodontia and general dentistry. I have, at different times been in correspondence with Dr. Angle and in a recent letter he makes this

statement: "Orthodontia and Dentistry are as oil and water, they can not be mixed." In a sense this is true, for the best results can not be obtained if one is to mix his practice of orthodontia with a general practice of dentistry. Perhaps this is what the doctor meant. But others have made the same statement with entirely different meaning, and with this I disagree. My degree reads, "Doctor of Dental Surgery." I am a dentist. If I had received the same teachings in the different dental colleges that I attended as thoroughly as I was drilled in the different branches of orthodontia under Dr. Dewey, I would know a lot more about the oral cavity than I do today. I believe that this situation exists with all of us who are not in the general practice of dentistry, and it is our duty to attend all dental meetings we can. I believe that we should take special courses in microscopic work, in bacteriology, histology of the tooth, peridental membrane, and of all surrounding tissues. We are as a whole very much at sea as to these structures, and of what takes place about them under different conditions such as trauma, devitalization of the pulp, overhanging fillings, misfit crowns, etc., I know I am in many cases, although I have attempted to gain knowledge wherever possible, and especially by personal experience.

How often do we meet the little patient, with the six year molar devitalized, or with poorly placed fillings with overhanging edges, maybe a gold covering called a crown, that hasn't even the semblance of a tooth crown, nor does it touch the gingival walls of the tooth closer than an umbrella touches the head of the person under it when open. Are we as orthodontists to sit back and allow these conditions to continue to exist in the patient's mouth, even though the case is referred to us by a dentist, because we are afraid we will offend him and afraid we may lose a patient from him? We must consider this very much differently than we have in the past.

The crux of the matter is this: we do not as a class permit these things through willingness, but because we do not have the confidence, the knowledge, we should have of the other fields of dentistry and by this ignorance, we risk in every such case every prospect of success of our own work on that patient. If we understood more the results of these conditions, cases which in the medical profession would be held by the law as pure malpractice, we would not hesitate one moment to make our motto: "The patient first, ourselves—our professional judgment, second, and the dentist last."

We were taught the function of tooth forms and I am sure that every man was given a very different conception of how every tooth functions through its form than he ever had before. I am sure many of our dental friends do not recognize the importance of better work else we would not see some of the work turned out by them.

I feel that we should work to secure better harmony and understanding between the different branches of all dental science. I feel we should have men in the different branches give us papers and clinics so that we be better informed along those lines. Having given up the general practice we are more than apt to take less interest in other fields of efficiency unless we keep in close touch with their progress.



There has been some apparent trend for a number of years to separate orthodontia to such an extent as to almost isolate it from all other branches of the healing art. I believe this wrong. I feel our meetings are not held at the proper time of the year, neither should they be held at any other place than where the National Dental Association is held and then just previous to that meeting so that those of us who want to stay over and gain what we can from the other branches will be able to do so. As it now is, we meet in the spring, when a great many patients are getting ready to leave for the summer, and we are preparing "retentions" for many. It is true that the last meeting of the National was held at as poor a time, for our patients were then returning to begin active treatments, but that is a matter which could be easily adjusted if the proper spirit of cooperation could be established throughout our whole profession. There are difficulties within our own branch which would have to be met, such as avoiding confliction with the school period. Both as I view it, the school and the annual re-study period of the graduates are vital to the success of orthodontia and if the condition is general that spring conventions break in seriously on our yearly work, I am sure that if we but bring this to the attention of our members we would have their earnest cooperation to provide such arrangements that the general best interests all around are protected. The place and time for the National should be chosen and that time annually, and then we should precede it by a week.

You do not see the rhinologists, internists, surgeons or other specialists holding meetings at far separate times and places. There is a meeting of the American Medical Association and the sections are there divided, but any one can attend any section he chooses. The body they aim to treat is the same body we aim to treat. The body the dentist aims to care for is the same one we aim to care for.

I do not speak alone in this matter. I know that among our members there is a genuine desire to cooperate with our whole profession in our annual conventions. I know from talking with men in the general practice of dentistry that there is a feeling that we are disposed to be clannish—a feeling of resentment because we make no effort to cooperate. And they are not so much the losers as we, for our specialty demands a wider knowledge than is required of the general practitioner and we must keep pace with general progress in all branches. We can not attend both without providing for first two to four weeks for orthodontia and then in a few weeks a similar time for the National. We can not take all this time away from our offices without serious neglect of our patients. Neither can we afford to attend these conventions as vacations. It should be a period of work and study every day. Both health and efficiency of every practicing orthodontist is bound up in this general question of convention dates with the ultimate foregoing of needed vacation periods unless changes are made. I hope this subject will receive your earnest attention and that it will be freely discussed with the idea of coming to some definite understanding.

We should think more of the healthful results to the patient than to esthetic appearances, and in order to do this we must always carry the responsibility of what is being done for that patient; if we are to be fit to do this we must al-

ways be acquainted with all parts of the oral cavity and its relations to the rest of the body. If this is true, then orthodontia and dentistry are not as oil and water; they should mix and mix as butter and salt, a distinct something yet a vital part of a smooth bulk. There is a definite relationship between orthodontia and general dentistry which we can not deny if we are to carry into our professional practice the highest degree of efficiency.

I wish now to take up the future of orthodontia from the viewpoint of numbers. We know that the nation is seriously under-supplied, that, in several states there is not a single representative of this branch and that in no state is there an adequate number. We know that there are branches as yet untouched which should be under the direction of orthodontists but which must be neglected for want of men. We also know that ours is a branch which can not be entrusted to every man; it is the picked man, the man with special endowments who must be permitted to specialize. To those who are enthusiastic in their profession and who are awake to this great need, there is prone to be an enthusiasm which disregards the limitations which must be maintained in class enrollment.

Dr. Angle has demonstrated that in an eight weeks' course of study a foundation could be made for an orthodontist. He proved it by turning out such men as Dodson, Hawley, Watson, Young, Lourie, and many others. But he insisted that to do this he must not have overcrowded classes—that there was a limit to the number to whom the work could be given and concentration maintained.

I was one of a class of three to work under Dewey and I know that we three men made more models than any class of ten men ever made and that ten men would hold a like advantage over a still greater number. I know we were more concentrated than any other class. We had nothing to divert our minds when he was giving us a lecture, when he was making an appliance for a patient, each of us had room to see what was going on, we were not in each other's way when looking in that mouth. I am also sure with classes of ten or a dozen, no school exists where a stronger foundation can be laid than we received. I have often heard the remarks from men who had taken a short course in extraction such as this, "I guess he got it; I couldn't see; there were too many standing around in the way." Or perhaps this, "Well, I paid \$200 for the course and I never saw any of the work; there was too large a class."

I have discussed this phase of orthodontia with which I know you are all familiar because I have often listened to discussions in past meetings regarding the proper length of time for one who is desirous of becoming an orthodontist to spend in preparation. Two alternatives are open to us to solve this growing need for men and at the same time aid in preserving the high standard of efficiency resulting from intensive work with limited numbers. One is to have larger classes, but to lengthen the period of instruction sufficiently to allow for the slowing up of the class which results from overcrowding. If this is done, it can only be done with the loss of concentration. After a time the class loses interest, concentration can not be maintained either with the one in charge over the longer period or with those in the class.

The other alternative is to increase the number of terms, using the whole year if necessary, but still maintaining the eight weeks' program of intensive

training and sticking religiously to restricted numbers of those eminently fit to take the work. With such a plan all the benefits of the past methods of training would be retained for our profession and we would avoid the harmful results which would inevitably result if from demand from the public or from those of us who in the field plead for more men, the value of concentrated study would be lost through class enlargement.

This, to my mind, is one of the most serious problems before us. We all desire the spread of our numbers; we all insist that no set of circumstances shall force a relinquishment of the training methods which in the past have been fruitful of highest efficiency. In the field, we are scarce conscious of the tremendous demand for graduates and of the problem constantly confronting those trying to harmonize all these conditions. We who are gathered here are practical men, loyal in high degree to our teachings and our teachers and I hope if through frank and earnest discussion we can contribute constructive aid, we should, during this convention do so.

I wish now to consider the need of a definite code of ethics to govern our profession. It is my firm belief that we, as orthodontists, should deal more and more in the subject of prevention of conditions that we know will result without proper care. In the past we have dealt some in etiology, and the proper age to begin our treatment of correction. Most of our work has been along the lines of appliances and the final esthetic appearance of the teeth. This was necessarily so, for in the establishment of a profession there is urgent need of immediate returns. But we are no longer in the formulative stages of professional growth and if we are to establish our worth to the generations we must make as the keynote of our labors, not the greatest return in the shortest time, but the greatest good. We are but following the beaten path of medical experience; the successful physician, the worth-while physician, now looks as much and more to the prevention of disease and malformation as to its correction afterwards. And he has not suffered one dollar in reward. In fact he has clothed his profession with greater dignity and built up for himself a happier field of work than the old one when he formerly faced only distorted and diseased patients. We may well profit by their example. The true scope of orthodontia is to prevent as truly as it is to correct.

I can not too strongly urge you to avoid the narrowed vision that seeks only the immediate gain. We can not justify our specialty unless we conform it to the other great healing arts which seek to build up a healthier race not through attention to the diseased and deformed but by education and watchful care under which the race develops straight and true. Can we not make some arrangement with our medical and dental friends to borrow every child, say from the time the first tooth erupts, until the child is 12 years old? I am sure that if we do, we can see that the teeth are kept clean, that tonsils and adenoids are removed where necessary, that proper diet is advised and then through our corrective facilities that proper digestion is secured through teeth which function as Nature intended. If we can only secure this result, we can feel that the child is our ward, not our source of profit only, far greater results will be obtained than could ever be through merely corrective practice.

Many states through their Departments of Education provide for dental attention in schools wherever possible, but unfortunately this supervision is invariably by members of the restorative branches, practitioners without a knowledge of needs made clear by our science. It is my hope that the day may come when the need of attention to the child during the period of teeth development may be made the duty of an orthodontist as the chief inspector because of his special training and ability to recognize early conditions that might be very detrimental to the child's future.

We all know what happens to the mouth of the child who is allowed to suck her thumb or pacifier; we know what results when the temporary molars are allowed to decay and become abscessed. I have recently seen a record of the white blood count from many little children who had abscessed teeth, the count being made just before the teeth were extracted and from 24 to 48 hours afterwards. The difference I am sure would make many of you open your eyes and in the future keep your ear to the ground to catch the next case before these conditions occurred.

Our societies have always aimed for the best as the best was understood. Appliances have held the center of the stage always. True, if they hadn't, we would not have the beautiful, clean, and comparatively comfortable attachments we have today. Yet, I am sure that what we have now will surely correct any malocclusion we may be called upon to treat, and I am convinced that we should now turn the spotlight over to that portion of the stage marked "Prevention." It is the biggest thing in the healing art today. There are so many ways in which we as orthodontists can prevent malocclusion. If we can get the little child in the period of eruption of the deciduous teeth, we can then see that the teeth are properly cared for; not only will the permanent teeth be apt to erupt more normally, but the very health of the child will be benefited. What does a beautiful set of teeth amount to if the owner through earlier neglect has been broken in health?

I believe the majority of our men are too busy to do the necessary cleaning, and if this is so, we should all have with us in our offices either an assistant or associate whose entire time could be devoted to just polishing the little fellow's deciduous teeth.

We have a few practicing nothing but pediadontia, and they are the savers of thousands of cases that without doubt would otherwise result in deformities. These deformities, of course, can to a great degree be corrected by orthodontia, but would it not please us as much or more if we could prevent to a large extent a great many of these cases?

From the actual standpoint of dollars and cents, if we insist on answers in those terms, would we not be able to receive as much from each case by having a dental nurse keep these teeth clean, thereby saving the teeth from cavities and the resultant loss of tooth structure, which is perhaps as great a producer of contracted arches as any one factor with which we have to deal?

At the same time we are removing this cause of malocclusion, we could save the child from the danger of abscessed teeth and the resultant effects of focal infections on the system as a whole.



Many states have already recognized this need of trained nurses for our professions and have made provision whereby we can engage nurses who have had training along these lines.

I feel deeply that we as men who do and should come in contact with the early life of humanity should at every opportunity encourage the preventive side of our profession. I should like to have our society discuss this subject with a view of definite expression and definite results more, far more, than we have ever done in the past. No profession can long exist without a fundamental ideal, a vision of a greater goal than the mere acquirement of money. We who have been chosen for special fitness to serve in this advanced field of dental science must above all others shape these ideals. So long as we strive only to the corrective side, we limit our field of usefulness. To reach our fullest measure of service and value, we must recognize a call to service not only to the malformed but to all the coming generation that may avoid those conditions—our large field for lasting service must be more and more in the cause of prevention.

Gentlemen, to my mind, one of the great functions of a convention of this kind is that it may serve as a clearing house of all the ideas and progress which our members have experienced. In the brief time we are together we have scarce time for else than the most vital and important of the matters which confront us as an organization and as a profession. I have tried to outline before you the main problems demanding our attention as they have appealed to me. For the sake of clearness I wish to just briefly review them for you. I believe that we must understand the history of hard work and sacrifice out of which our profession grew, holding that such understanding is necessary if we are to fulfill the personal obligation which each orthodontist holds to his society and his specialty.

I feel that three special problems stand out above all others in urgency and in my paper I have confined myself strictly to them. I believe first that we should seek to create a closer cooperation between ourselves and the other branches of dentistry,—that this is needed if we are to keep informed on their progress and be the dental expert that success in orthodontia exacts. I believe that of fundamental importance to this end is a change in the time of our society meetings so that they harmonize and ally themselves with the annual meetings of the National or vice versa.

My second point was that a definite policy regarding the increase of our graduates should be discussed and adopted; that in establishing such a policy we should recognize the crying demand for more men in the field, but that we must preserve religiously the class system of the past which through limited enrollment over a period of eight weeks of intensive work has been fruitful of such satisfactory results. And in conjunction with this I pointed out that if we did increase the numbers, the only feasible plan was to increase the number of terms.

Finally, I spoke of the need of a definite code of ethics for the profession. This itself an outgrowth of the other two, must find expression in greater attention to the almost undeveloped side of preventive orthodontia as well as the corrective. In fact, we will reach our greatest measure of worth when, and only when, we have made corrective practice the last resort, the safeguard to be resorted to where preventive treatment has not sufficed or where ignorance has brought the patient to us after the damage was done.

It is my earnest desire, gentlemen, that this program will receive your serious thought, your honest comment and discussion. We can not reach perfection in a day even if the making lay within ourselves. We are confronted by a larger problem still, because we must carry the public with us by intelligent education along these very vital lines. Orthodontia can not be established alone from our efforts in our offices. We must carry our message to the people till we become not a luxury to the public, but a necessity demanded by legal enactments—not a case of trial as the last resort after the general restorative practitioner has tried and failed but the court of first resort where the public turns earliest for advice and guidance to avoid, as well as correct, the ills to which mortal man is heir. The danger in any profession is that the individual becomes narrowed in his own specialty. Our success rests entirely on our ability to avoid this thing. Orthodontia is synonymous with efficiency. We can not be efficient unless we do provide for efficiency. We can not be efficient unless we do provide for a proper coordination with the other fields of dentistry, unless we preserve as requisite requirements of all future graduates into our ranks the highest standards, unless we recognize that our great specialty rests not alone on correction, but equally, if not more, upon the great field of prevention. I believe these problems warrant above all else the consideration of this convention.

#### DISCUSSION

*Dr. Sidney W. Bradley, Ottawa, Ontario.*—The president has delivered a splendid address. I congratulate him on his enthusiasm, his high ideals and the excellent ideas embodied in the paper. I can agree with practically everything he has said.

In regard to holding our meeting before the National Dental Association I think his idea is a good one, provided the American Society of Orthodontists would do likewise.

I did not receive a copy of the address in time to prepare a formal discussion. I looked over it this morning. I think every essayist should supply those who are to discuss his paper with copies of the same in advance of the meeting. Then the paper will receive careful discussion and thoughtful consideration. It is impossible to do justice to an address of this kind by any impromptu remarks. Every one of us who has traveled from 2500 to 3000 miles to attend these meetings does not want to hear impromptu discussions when carefully prepared discussions might be given if the essayists supplied copies of their papers previous to the meeting to those who were on the program to discuss them.

I believe that there should be closer cooperation between the orthodontists and the general dental practitioner, especially with reference to the matter of extracting temporary teeth. Most members of the dental profession in general practice are only too willing to let us decide that, and there is no person better able to decide than the orthodontist when the temporary teeth should be extracted.

I thought of a few ideas yesterday while coming here and they are practically the same as those set forth by Dr. Weeks. Article II of our Constitution says that the object of this society should be to advance the art and science and literature of orthodontia; to foster fraternal relations and intercourse among its members; to safeguard their material interests and the interests of the public; to elevate the standards; and improve the methods of orthodontic education.

These are high ideals, and we could not do better than live up to them, promote fraternalism among our members, promote sociability; to have a common ground where we may meet and discuss the latest and best in orthodontia.

After all, the public is the judge of our successes and failures, and the public, speaking generally, is a pretty good judge. If the members of our specialty can not "deliver the

goods" we have no right to exist as a specialty. If we do good work and are useful to humanity, we have a right to exist as such.

Take the older members in orthodontia, they are watching the Dewey graduates closely, and if we make a success we shall do honor to our school. It is true, as Dr. Weeks has said, an eight weeks' course will not enable one to become an orthodontist. All such a course can give us are the primary principles for laying the foundation. We must study diligently after we graduate, and if we do that we will be a success. If we love children and the Lord intended us to be orthodontists, our success is assured. How is that for predestination?

We must realize in our practice that mechanics alone will not make an orthodontist. We must study the underlying principles, the physiologic properties of active growth, rest, and development. We can do this best clinically at the chair.

Our science is only in its infancy. I believe that the next ten years will see a great change in both methods and appliances. Every appliance Dr. Angle has brought out is used extensively, but I think most men when they use those appliances a few months try to improve them to suit their own personal ideas. After all, the personal equation is an important factor in our work. An appliance which suits one may not suit another without modification.

I know we are going to have a good meeting, and I trust every one will take part in the discussions. If any of you have a good idea, do not sit in your chair afraid to give it to others because of false modesty or timidity. If you do not give the rest of us your idea, we will lose the benefit of your experience.

*Dr. J. Frank Nelson, Chicago.*—It occurred to me when Dr. Weeks was delivering his address that it must have been very difficult for him to write it. I have felt that this was a rather harmonious, almost perfect, organization. We seem to get along very well together and are making considerable progress. We have proof of that in the Dewey Alumni. I feel deeply along these lines and am gratified to see that we are so harmonious.

I have enjoyed Dr. Weeks' address very much. The points he has brought out are interesting. He delivered an eulogy on Dr. Angle and Dr. Dewey. I am sure we all agree with him regarding these two men.

He spoke of our relations to the general practice of dentistry. It occurred to me at the time he was speaking of that point that it would not be a bad idea, if we have any right to do so, to require men entering the practice of orthodontia to have from five to ten years general practice. This would give them a better knowledge and a broader view of what the general dentist is doing by reason of his experience, more than any other way. I do not know what the requirements of the school now are, but I think it would be a good idea.

Dr. Weeks spoke of the time of holding our meeting. The meeting of the National Dental Association at the present time is an enormous thing. The only argument I can think of which seems to me to be a good one in that regard is that it will permit us to take in everything at one meeting. We would not have to leave home but once in a year, if we had all these meetings at the same time. If we are going to ally ourselves with the general dentists at these meetings, why not go a step further and have the general dentist and the orthodontists, the physician and rhinologist meet at the same time. I think the argument is feasible. In my experience, I have been closely associated with rhinologists a few times, and they are working along lines close to ours. I do not know of any other argument against meeting with the National Dental Association except that it would be too large.

President Weeks spoke of the importance of our studying prophylaxis and of paying special attention to prevention. I think that is a very good point. Every orthodontist should be thoroughly familiar with what the periodontologists are doing. We have children under our care at a time when they are most susceptible to impressions. If we can get them to form habits of mouth hygiene and cleanliness at that time, they will remain with them the rest of their life. If we can show them two or three times a month how

to care for their mouths, and have the opportunity to see the children at regular intervals, we can do both the prophylaxis and regulating. We should pay special attention to prophylaxis. Orthodontia really is, in a measure, prophylaxis.

As to the size of our classes and the conduct of the school, I am not familiar with what our president desires in his recommendations or suggestions as to the policy of the school. I know we need more orthodontists. Possibly it would be better to limit the size of the classes and increase the number of sessions during the year, or take all the students who come into the class, as many as wish to come in, and increase our capacity of the school. Dr. Dewey can lecture to 100 men as easily as he can lecture to one. I think the size of the class makes very little, if any difference to him and the only change necessary would be to increase the number of demonstrators and make some change in the conduct of the technical part of the work.

However, I do not know that we have any right to dictate the policy of the school, although I am sure they will welcome suggestions from the alumni.

Speaking of getting an opportunity to see the mouths of very small children, I think we should *try* to have these children under observation from the time they are two or three years of age. That is all right as an ideal, and it might be worked out in a limited way, but I can not see how we are going to be able to get hold of a great many children at that age. It certainly would be the ideal way to practice orthodontia, and we could do a great deal of prevention if we could guide a lot of teeth into place, and in that way avoid malocclusions.

I enjoyed Dr. Weeks' address very much, and would be very glad to join the society in making recommendations along the line he has suggested.

*The Chairman (Dr. Oliver).*—A great many points have been brought out in connection with this address which I feel should be discussed freely. Each man here should feel that this is a large family reunion, and any man should feel himself free to discuss this address. No man should keep his seat if he has some good ideas to bring up. I sincerely hope you will discuss not only this paper freely, but that you will feel at liberty to discuss any paper that is to be read and bring out as many good points as you possibly can. We are here to learn. This address is now open for general discussion.

*Dr. F. C. Rodgers, St. Louis, Missouri.*—I deem it a privilege to take the floor on this occasion because I am not a full fledged member. I hope to be in a short time, at the next session of the school.

The president's address is so full of good ideas, so full of excellent points that urgently need definite action, that they should not be passed over as I have seen in the past when presidents have made recommendations in their addresses. They have simply been forgotten after the meeting adjourned.

Dr. Weeks certainly has analyzed the situation of the orthodontic profession in relation to general dentistry, and it is that point I wish to discuss from a constructive standpoint, particularly the possibilities of orthodontists in a constructive way, and what they can do for the general dental profession. Dr. Weeks mentioned some of the objectionable features with which the orthodontist is confronted, namely, poor restorative work on the part of the dentist, and what is the orthodontist going to do in cases of that kind? We can not return a patient to the dentist with our personal observations and criticisms of constructive work; we can not do that, although it is our duty in reality to do so, because we must consider the good will of the dentist as well as the good will of the patient for that dentist. Remember, we antagonize not only the dentist to the orthodontist, but we antagonize the patient to the dentist if we criticize his constructive work. Although this criticism may be justified in the light of the patient, the patient will realize that work is not properly done, if it has to be done at the recommendation of the orthodontist.

Is the dentist capable of doing better constructive work than he has done? It has been my experience that the average dentist does the best work he conscientiously and technically can do; I have reference now particularly to the class of dentists who recommend patients for orthodontic treatment. It has been my experience, and I have no doubt it has



been the experience of those present, that work which is improperly done in the mouth, if the patient is referred back to the dentist, will eventually show very slight improvement, if any. I have referred back cases to dentists where there were amalgam restorations in the teeth, with the recommendation that gold restorations should be made, and the patient has returned in course of time with inlays, with overhanging margins, with poor contact, poor occlusal restoration, and the restoration was really worse than the amalgam.

The same thing obtains in crown or bridge work. I have particularly in mind a recent case where I separated the cuspids from the centrals, where there were two missing laterals, congenitally missing. I gained sufficient space for the lateral to use an artificial substitute, and I returned the case back to the dentist for restorative work. The patient came back with artificial substitutes of laterals in place, fastened by clasps to the cuspids with a bar across the lingual surfaces of the centrals, but the position the laterals occupied in relation to the occlusal plane of the teeth and the gingival margin of the gum was really disgraceful. I thought to myself that the case looked more unsightly with these artificial substitutes than the original model showed it to be with the cuspids in close contact with the centrals. That is an illustration where the orthodontist is helpless to dictate what to do and how to do it, to the dentist.

But there is another angle we should consider in connection with this constructive work. I will relate briefly the constructive work that is being done in our city by the orthodontists in preparing the dentist to do better work. We all know the shortcomings of the dental curriculum in teaching general dentistry. We know the limitations of the great mass of students. We find that the students are incapable of carrying out the technic taught them by their teachers, but the majority of the students have sufficient technic to pass requirements of the State Dental Board and faculty of the school, and at the examination they are not given an ideal case, that is, to insert a filling, or make a crown, or construct a bridge for a State Board examination. There is a deficiency in dental education. There is a lack which is demonstrated in the future progress of the average dentist.

It is within the power of the orthodontist to do some real constructive work in overcoming difficulties or in helping out the dentist.

Postgraduate courses are given in the City of St. Louis free to the dentist, and they have an enrollment of 145 dentists attending this class, and the progress that has been made in a constructive way in dental technic is really remarkable. That is constructive work that the orthodontist can institute in his own home wherever he is located. He can organize study clubs among dentists, not in orthodontia, not for the purpose of giving clinics in orthodontia, but organize study clubs among dentists to teach them dental technic, root canal construction. From the beginning of a small sized study club of six original members, the club has grown in membership in one year to 146 bona fide enrolled students. Teachers volunteer their time; the best teachers available are selected to act as instructors and to conduct such clubs among the members of the schools. That is something constructive to the orthodontist, it is something he can do, and it will redound to the credit of the orthodontic profession, I know that from experience.

Those of you who attend the state meeting of Missouri will see a clinic given there by the study club which will be not only a surprise to the dental practitioners in Missouri but to any one who is privileged to attend the clinic. They are doing remarkable work along the latest ideas in reparative dentistry. The subject of orthodontia is not mentioned in any way, but it is the desire of the dentist to cooperate with the orthodontist in regard to extracting deciduous teeth, and the dentist should always consult the orthodontist before extraction, and so on. The real work is accomplished by teaching the dentist to do better dentistry, and then we will eliminate some of the difficulties we have to contend with and concerning which at present we are helpless.

*Dr. Lourie J. Porter, New York City.*—Dr. Weeks spoke about holding our meeting in connection with the National Dental Association meeting. In respect to that, I do not think we would have the concentration in orthodontic work, if we held our meeting at the same time as that of the National Dental Association. The argument has been advanced that there are a number of men, orthodontists, who are interested in the general profession

and give their time during that week to the dental profession regardless of orthodontia. If the two meetings were held together it would virtually mean two weeks, and as a rule in that time we would get tired. If our orthodontic meeting was held separately, or the week before the National Dental Association, we would have a chance for greater concentration on our work in orthodontia, and we would not have to stay for the meeting of the National Dental Association unless we felt like it. It seems to me better not to hold these two meetings together.

*Dr. O. H. McCarty, Tulsa, Okla.*—Many of the gentlemen here evidently live where it is convenient for them to attend both the National Dental Association meeting and the American Society of Orthodontists. On the other hand, there are some of us who live across the country, in the southwest, where we have to ride long distances to attend these meetings. Our income is not great enough to make both of them. It is impossible for some of us to reach all of these meetings when they are held at different times of the year. Why not have them meet at the same time, as Dr. Weeks has suggested? Most of us I think would like to have both meet as nearly as possible at the same time.

*Major Jos. D. Eby, Washington, D. C.*—If you will pardon my digression for a moment from the address which our president has so ably delivered, I would like to answer one question which all of my friends whom I have met this morning have asked me.

I have remained in the army because of many attachments to the service including devotion to the dental corps as the representative of modern dentistry, which must exist on as high a plane in the army as elsewhere, interest in our remarkable clinic at Walter Reed U. S. Army General Hospital and particularly for the maxillo-facial patients and from whom we are beginning the final compilation of records so as to permanently record all of the principles employed in their treatment.

I feel that as an orthodontist, this work is a particular obligation by virtue of the fact that all of the principles of successful procedure are founded fundamentally in the basic principles of orthodontia and I trust that my work will reflect the fact that if one adheres consistently to orthodontic principles, he will not depart far from the best results, this I state in interest of the fact that it behooves all of the younger members of our great specialty, as highly trained and specialized men, to realize that they must be efficient in this phase of orthodontia which abuts oral surgery, and as a matter of personal pride at least, be prepared to serve in this capacity wherever necessity demands.

Col. Robert T. Oliver, chief of the Dental Section of the Surgeon General's Office, called me to his office before my departure and instructed me to convey to you his best wishes and to elicit your good will and interested cooperation in the work which he is doing for the accomplishment and maintenance of the very highest standards of dentistry in the army.

I wish it were possible in connection with all of the thoughts which I have presented, to impress the remarkable possibilities of the orthodontist in the maxillo-facial field, and if you would only grasp confidently, my perspective, it would induce you to enter the Dental Reserve Corp wherein you are capable of rendering a great service to our country and profession, not to speak of the patients whose good fortune it would be to be placed under your care.

I am sure that if you will address Col. Robt. T. Oliver, care of the Surgeon General's Office, Washington, D. C., and request information for status in the Dental Reserve, as orthodontists, your letters will receive most pleasant attention.

Our president has presented many of the most serious points which interest modern progress in orthodontia, points which require digestion and thorough discussion.

Personally, I am undividedly in favor of the proper development and license of Dental Hygienists, provided their sphere is properly defined and regulated. I believe they can be developed as one of the most valuable assets in a large practice of orthodontia.

The greatest subject which our president has touched upon is the question of education and it goes without saying that the Alma Mater, backed by this august Alumni, must be the forerunner and fulfill all of the demands which progress may impose.

I wish to compliment Dr. Weeks upon his clear vision in the selection of the topics in his address and their splendid presentation.

*Dr. R. L. Webster, Providence, Rhode Island.*—I agree with the president as to the point of maintaining small classes. I was in a class of six with Dr. Dewey, and I was much impressed by the individual instruction which we received. I understand there were thirty in the last class, and I think if Dr. Dewey had it this way, there were good reasons for so doing. I should like to hear from Dr. Dewey himself on this point.

*Dr. Martin Dewey, Chicago.*—I read Dr. Weeks' address yesterday, and some of the things in it I agree with. I hardly know how to take up the subject that has been mentioned because there are so many things to be said on both sides.

In regard to the time of meeting, that is something that will never be satisfactorily settled so as to please all. Judging from past experience of this society and the American Society of Orthodontists, I think you will have a better meeting if you will meet by yourselves. As to the remarks of my friend from Oklahoma, there are some members here who have had to travel as far as he has; therefore, the question of expense should not enter into it to a very large extent. What is the best for the greatest number should be the motto. I know you can not hold as good a meeting at the time of the National Dental Association, or at the time of the meeting of the American Society of Orthodontists, as you can by yourselves. You will lose a certain amount of individuality by meeting with the National Dental Association. The American Society of Orthodontists tried that a few times. The majority of the members here do not want to be the tail to the kite.

In regard to the size of the class, there are a great many things to be said in favor of a small class and also in favor of large classes. So far as my work is concerned, that would only be one thing in regard to the question, but you have to consider the fact that it is only at a certain time you can get the faculty together. You can not call the faculty together any time you think or wish. It is necessary to plan a year ahead for the course. We take a certain number of students because it meets the men's requirements. When we gave two courses a year in Kansas City most of the work was done by myself. As a result of that it was called a "one man course." To get away from that we secured a larger faculty. To have the faculty we can have but one course a year. There is question of equipment and facilities to consider. One must have a suitable place to give the course, and that is a well-equipped dental school. These things can not be secured in a short time or at any time they are wanted.

This question will probably be explained later on at some other meeting, because I know some of you wonder why we have done certain things, and why we did not do something else.

As to the size of the class, probably we can arrange to take care of a class of thirty or forty. With the corps of instructors we are planning to have we can take care of one hundred as well as a class of six.

With regard to accepting men for the study of orthodontia, it is a ticklish question. Who is going to decide the fitness of a man to take up orthodontia? I can remember very well what Dr. Angle did in regard to that. If he did not like a man he would not let him study orthodontia. He tried to decide who should and who should not study orthodontia. If a man is a qualified dental practitioner, that is as far as we legally can go. If in the beginning of the course we feel that a certain man is not suited for orthodontia or can not be an orthodontist, and would be a discredit to the school, we will give him back his money and turn him loose as we did last year. That is the best we can do, and that is what we intend to do if a fellow is not going to be an orthodontist. We will give him his money back because it will be a protection to orthodontia and to the school.

As to a man spending five years in general dental practice before he takes up the study of orthodontia, that is an important question. Dr. Angle made a rule that no one could enter his school who had been in general practice for seven years. I do not think it makes much difference whether a man has been in general practice five years or not, because the student or man can be just as big a fool at the end of five years as he was in the beginning. (Laughter.) So from personal experience we find such a rule works

both ways. The young graduate has some advantage over the man who has been in practice a number of years, and the older practitioner has an advantage over the young man by his increased years of experience, but so far as deciding the question is concerned, it lies with the individual himself, and the number of years he has been in practice may not count as much as one would think.

The president mentioned the question of dental nurses which finally resolves itself into the dental hygienist. As we have another paper on that subject which I am going to discuss, I will not say anything further at the present time, but the question of dental hygienists will have a reaction that I do not think the majority of you realize.

*Dr. Thomas T. Moore, Jr., Columbia, South Carolina.*—Since the size of the class has been mentioned, doubtless you would like to hear from one who was a member of the largest class ever graduated in orthodontia. Last year there were 35 of us I believe, and I wish to give my personal testimony to the effect that if any member of that class failed to get all that was intended out of it, it was largely due to himself. I am sure we accomplished about as much as you would in a smaller class.

So far as getting all of the instruction we possibly could in orthodontia, I feel perfectly sure that if there is anything I did not get, it was due to me, and not to the school.

*Dr. Weeks (closing the discussion).*—During the discussion I took a few notes, and I will try to take up the points in the order in which they were mentioned. Dr. Dewey and I disagree. If Dr. Dewey did not have the spirit of disagreeing when he has very set convictions on any subject, I do not think we would like him as well as we do. He is full of fight, and for that reason we like him.

As to the time a person would be best fitted to take up the study of orthodontia, notwithstanding what Dr. Dewey has said, I still believe that the man who contemplates taking up orthodontia as a specialty should have some years of general dental practice before he gets into the specialty of orthodontia. He has never seen what the results are from personal experience in dentistry until he has been five years in the field of general dentistry. He has not had education along the line of handling the public, and I feel that my experience in general dentistry aided me very materially when I left it entirely and took up the practice of orthodontia.

I still believe in small classes. While Dr. Dewey can get assistants, and can get demonstrators, yet in the end there is only one Dewey to lecture. I have seen some classes in which some member of the class was not interested in the lecture, and he would lounge around, perhaps go to sleep, and snore during the lecture, and disturb the other members in a class of ten. Now, in a class of thirty or forty there would probably be two or three fellows who would either snore or talk. When there are two or three talking, you may depend there are five or six who do not get as much out of the lecture as they should, and so the smaller the class the greater the concentration, in my estimation.

Major Eby has expressed my feelings all the way through. There was one point brought out which reminded me of a remark made by Dr. Oliver. We were at lunch yesterday and he spoke of making history cards. We know very little about the etiologic factors that produce malocclusion. I think Dr. Weinberger has gone into that more than any other one man, and still we know very little about it. If a committee could be appointed to draw up a history card, so that there will be plenty of questions to ask the parents and go back as far as we can and everybody is supplied with these cards, if such records are kept say for five years or more, and then hand these cards to the committee to use, I am sure we will have valuable material regarding the etiologic factors of malocclusion. We would have something definite.

There was quite a little said about the meeting place. I did not say that we should meet with the National Dental Association, but that we should meet prior to that society so that those of us who wished to stay over and attend the meeting of the National Dental Association might do so.

Dr. Rodgers said that we should not talk to patients regarding the work done by dentists. That is right. We should turn to the dentist who referred the work to us and talk to him. If you find a straight wall covering a crown without any chance of bringing



about normal occlusion with that, and the dentist refuses to remove it or do it over, it shows that he has not a true sense of his responsibility to that patient or he is not capable of doing better work. It is our duty and our responsibility to give such a patient the best.

Dr. Nelson spoke about whether he had any right to suggest or criticize the Dewey School. That school is ours. We can make or break the thing. It is true that Dr. Dewey is at the head of it, but we are ahead of Dewey now, and I think it would be better if every one of us would go right straight to Dr. Dewey and make any suggestions to him we think proper, and while we may disagree with him we are all friends. He likes us to know what is taking place on the outside. We have ideas that come to us that we should give to him. He will welcome them.

As to the dental nurse or dental hygienist, I do not care whether you call her a lady nurse or a dental hygienist. I believe we should take the responsibility of preserving the deciduous teeth.

I want to apologize to Dr. Bradley for not sending him a copy of my address, and the reason I did not do so was because I had not finished it.

The idea has just occurred to me that I have not dealt at all on the subject of ethics in regard to appliances used by different men in our society. I would like to say this: there are wonderful results gained by every man in this room, and furthermore all over the country.

Because a man is in New York, he is not better able to correct malocclusion with the Jackson idea than the man in Los Angeles is with the Angle pin and tube. Neither is the man in San Francisco a better man because he uses exclusively the pin and tube affair. The man in Chicago or Tennessee can produce as wonderful results with the 19 gauge lingual arch. It seems now with the great variety of appliances in use by different men and the beautiful results they are gaining, that for the man in California who may be using the pin and tube idea, to receive a patient from another member of our society from another section of the country, who uses a lingual or other appliance, and say to the patient or parent that the appliance in use is not right and thus and so should be used, only makes it very clear that that statement comes from the man only slightly educated in orthodontic principles, and it behooves the best to respect even the beginner; he may put something over that would be embarrassing to some one.

## THE RELATIONSHIP OF FORM TO POSITION IN TEETH AND ITS BEARING ON OCCLUSION\*

BY MILO HELLMAN, D.D.S., NEW YORK CITY

THERE is a prevalent tendency in our specialty to worship an ideal which by tacit but unanimous consent has been declared the goal of orthodontic attainment. The conception of this ideal, though expressed by the term *Normal Occlusion*, implies qualifications of such exacting character as to render its probable occurrence under average conditions exceptionally rare. Despite the short definition by Angle on the one hand and the elaborate and highly philosophic treatise by Johnson on the other, the exact meaning of normal occlusion has baffled the profession to such a degree as to bring about considerable confusion relative to the *practical results* obtainable by orthodontic procedure. To illustrate, an instance will be cited.

Among other casts of cases of malocclusion in my collections, those represented in Fig. 1A, were observed by an orthodontist. The first utterance made was: "abnormal frenum." To the query how he would treat the case he answered, "Well, I would remove the frenum by the electric cautery, and draw those centrals together." These casts are of the denture of a man over forty years of age, it was explained, and as may be seen by the illustrations (Fig. 1, B, C) the teeth are in normal occlusion. "Would you really treat such a case?" he was asked. "Indeed I would," retorted he.

Another instance, quite illustrative, is the invention recently brought to the attention of the profession which, it was claimed, may enable the orthodontist to detect any deviation from the normal in occlusion of a denture to the extent of a fraction of a millimeter. The practical utility (?) of such an instrument is undoubtedly obvious, and yet, its importance was so persistently urged on as though the solution of all orthodontic problems depended upon its adoption in practice by the profession.

Of similar interest is an occurrence met with in practice so peculiarly impressive as to have a queer effect upon the disposition of the most temperate of individuals. No orthodontist can deny the heartfelt disappointment, when at the expiration of extensive periods of time devoted to the treatment of a case of malocclusion, after cautious and careful retention for months or even years, the patient returns shortly after the removal of the last vestiges of the retaining appliance with the following remarks: "Doctor"—and placing the forefinger upon a certain tooth—"I can feel this tooth sticking out; are my teeth going back?" He is horrified by the thought of the prospects. For, according to previous arguments, irregular teeth get worse if they are not corrected. He tries to minimize the extent of the damage; but, as the facts in the case are undeniable, he is at a loss for a plausible explanation. Some orthodontists attribute the

\*Read at the Annual Meeting of the American Society of Orthodontists, St. Louis, Mo., April, 1919.

relapse to one cause, others to another, but pretty nearly all agree upon the necessity of correcting it again. As a consequence, the *ideal* orthodontic results obtained are apparently short lived. It has been my privilege to see several cases presenting ideal results as obtained by some of the leading men in orthodontia. But when asked how long the appliances had been off they said about six months.

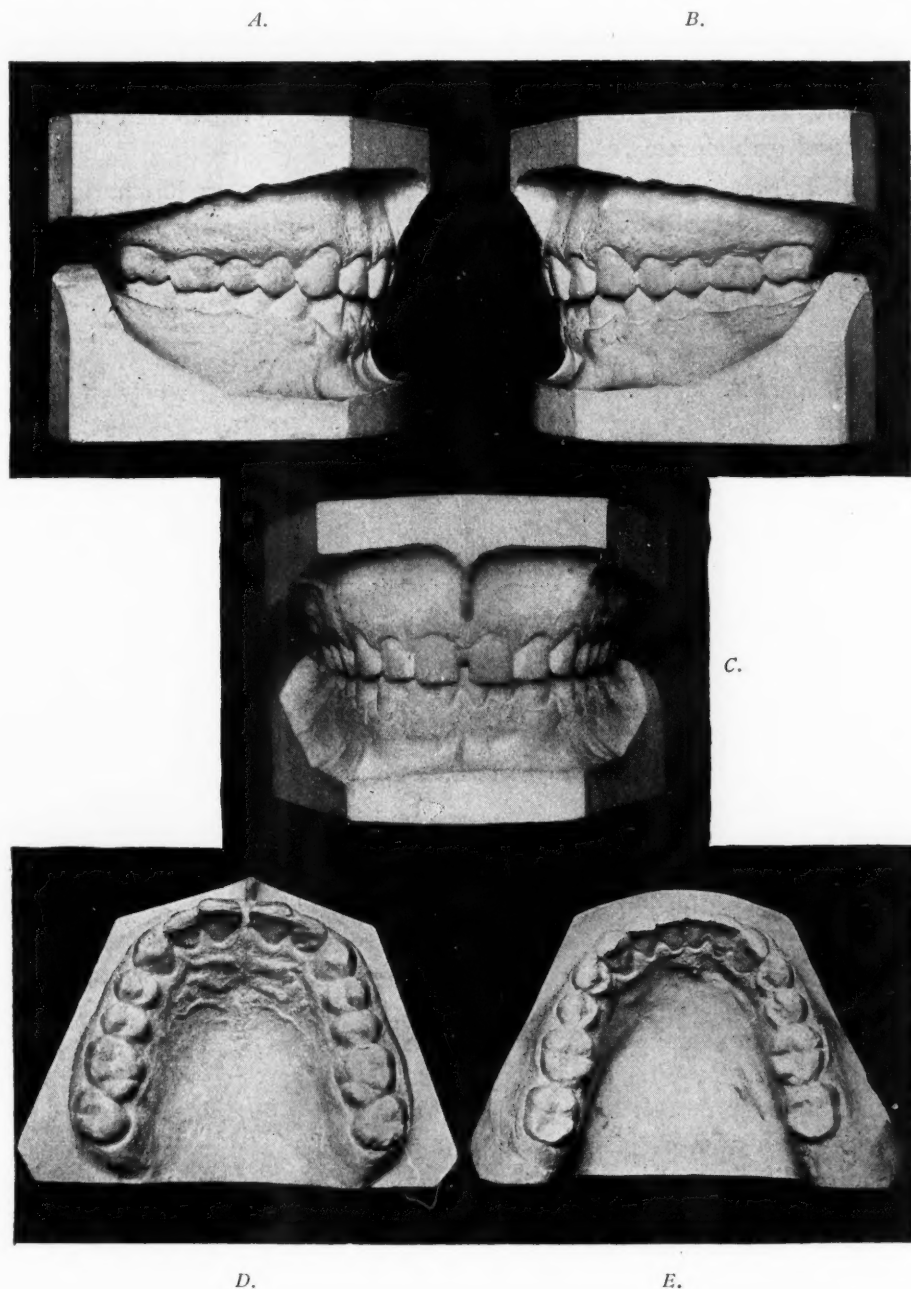


Fig. 1.—Casts of dentition of male of forty. A.—Front view, showing small diastema between upper central incisors, with somewhat excessive overbite. B.—Right side view, showing normal occlusion of premolar-molar series. C.—Left side, showing similar conditions as in B. D.—Occlusal view of upper dental arch, showing diastema between upper centrals, position of mesio-distal axis of central and laterals as compared with those in Fig. 27, the three-cusped second molar and missing third. E.—Occlusal view of lower dental arch, showing position of incisors, canines and premolars in their arch curve differing from that in the teeth of the upper arch; also notice the right third molar in the course of eruption.

These instances illustrate first, the extremes to which the conception of normal occlusion tend, and secondly, the demands upon which this conception is based. Thus, the exacting nature of such demands render even the ablest, most expert and conscientious of orthodontists not *always* sufficiently competent to obtain in *all* cases *lasting ideal results*. By this is meant, of course, results that would simulate the *conceived ideal*, years after all appliances will have been discarded, and all the teeth shall have adapted themselves to the tasks imposed upon them by the various habits involved in the mastication of food, in the respirations of air, in the enunciation of speech—and by other habits that are so liable to spoil good orthodontic results.

To disillusion ourselves from idealisms and gain an understanding of the scientific aspect of occlusion, it is necessary to relinquish all notions of abstract phenomena and resort to a study of the concrete manifestations in Nature. How many of us are familiar with the results obtained by nature through her per-

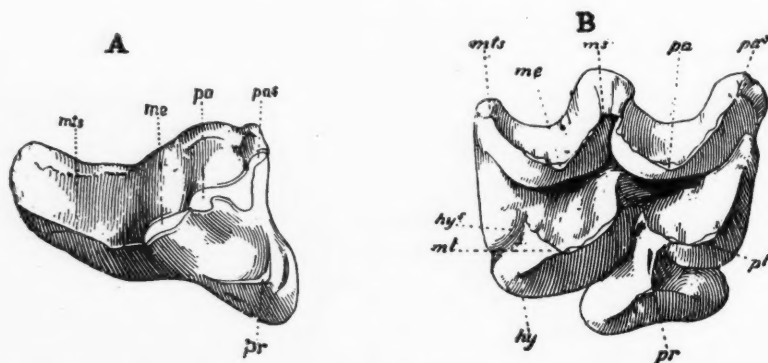


Fig. 2.—Two teeth, showing divergent derivatives of the tritubercular molar pattern. A.—Sectorial molar of *Oxyæna* of the Eocene period. B.—Grinding molar of modern horse; pr, protocone; pa, paracone; me, metacone; hy, hypocone; pas, parastyle; mts, metastyle, etc. (After Osborn.)

sistent and ceaseless efforts in the endeavor to produce an efficient masticatory apparatus throughout the animal kingdom? How many of us appreciate the fact that in order to produce the form of teeth constituting the human dentition required millions of years in time and innumerable experiments on the part of Nature? Also the ingenious manipulation and endless experimentation it required to place each tooth in its allotted position in the dental arch of man? For instance, obvious as the difference in form of the two molars in Fig 2, *A* and *B*, may appear, it requires a keener perception to appreciate the character of divergence in their morphologic modification. For, although one molar (*A*) is a sectorial tooth of a carnivorous animal (*Oxyæna*) of the Eocene epoch and the other (*B*) the grinding tooth of the modern horse, representing types adaptively so far apart as to confuse even experienced odontologists, "the existence of homogeny or common derivations through which we can now compare cusp to cusp" (Osborn) is plainly evident.

It must, therefore, be granted that only upon a thorough appreciation of these facts will we realize that although we have learned, as orthodontists, to produce changes in position of the teeth in the human jaws, we are utterly incapable to bring about the slightest modification in their form. And, whereas



there appears to be a relationship between form and position in teeth, as is borne out by abundant evidence, in evolution and in comparative anatomy it is well to remember that in all orthodontic procedures this factor plays a role of considerable importance. Furthermore, since changes in form are entirely beyond the control of the orthodontists, the position of the tooth should be based upon an interpretation of its form. Such interpretation, on the other hand, must necessarily depend upon a knowledge of the natural processes that were instrumental in originating, shaping and placing the teeth in the positions as found under normal conditions.

The subject, therefore, resolves itself into studies on:

1. Evolution of the Mammalian Molar Teeth and Its Bearing on Occlusion.
2. The Number, Form, Position and Occlusion of the Teeth of Modern Placental Mammals;
3. Evolution of Form and Occlusion of Primate Teeth;
4. The Form, Position, and Occlusion of the Teeth of the Anthropoids;
5. The Form, Position, and Occlusion of the Teeth of Primitive Man;
6. The Form, Position, and Occlusion of the Teeth of Modern Man.

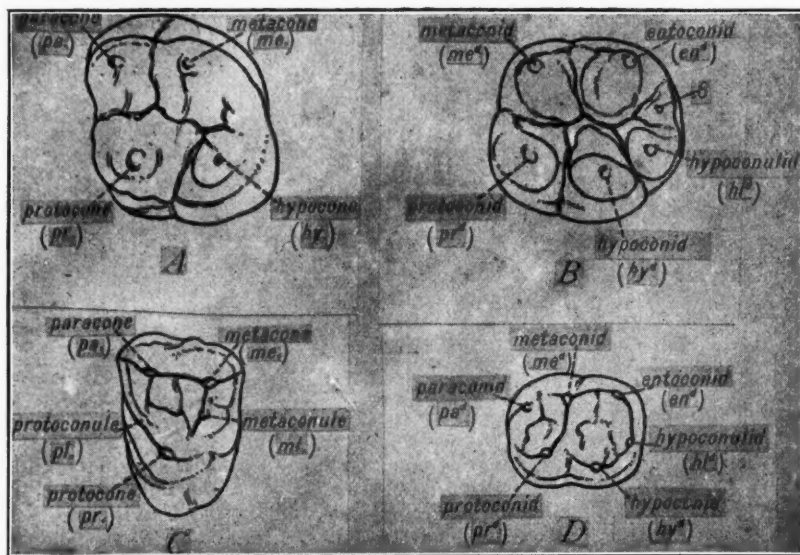


Fig. 3.—Cusp nomenclature as applied by Prof. Henry Fairfield Osborn to the teeth of *Man* and *Pelicodus Trigonodus*, an Eocene primate. A.—Occlusal surface of upper left molar of man. B.—Occlusal surface of lower left molar of man. C.—Occlusal surface of upper left molar of *Pelicodus Trigonodus*. D.—Occlusal surface of lower left molar of *Pelicodus Trigonodus*. (After Gregory.)

#### 1. EVOLUTION OF THE MAMMALIAN MOLAR TEETH AND ITS BEARING ON OCCLUSION

The discovery by Professor Edward D. Cope, in 1879, of the oldest fauna of the age of mammals, or Tertiary period, near the Puerco Cañon in North-western New Mexico, revealed a general similarity in all the molar teeth, even among animals of diverse feeding habits. This similarity consisted in the possession of *three main cusps on the crowns of both upper and lower molars*, disposed in triangles. This was evidently a primitive type of molar tooth, and in

1883 Prof. Cope appropriately named it the *tritubercular type*.\* By comparing these with the teeth of more recent animals, the further conclusion was reached that the "*tritubercular type was ancestral to many if not to all of the higher types of molar teeth.*" The superabundant evidence from which these deductions were made then, and the study of additional collections bearing on this problem gathered since, have established the primitive tritubercular type of molar not as an hypothesis or as a theory, but as a *fact*.

Based on authentic and reliable evidence from collections of paleontologic material studied by Prof. Osborn, Dr. Matthew, Dr. Gregory and Mr. Granger of the American Museum of Natural History, it has been made quite plain that the trigonal upper molars and the tuberculo-sectorial lower molars are the true ancestral pattern and may be traced along divergent lines into the more com-

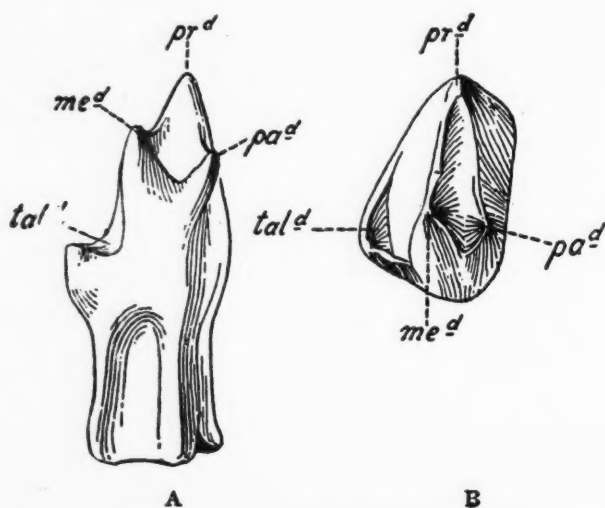


Fig. 4.—Diagram of a primitive tritubercular lower left molar (*Phascolestes*). A.—Lingual aspect. B.—Occlusal view. (After Gregory.)

plex molars of various groups of insectivores, carnivores, condylarths, perissodactyls, primates and other orders. Thus, it is a fact worthy of considerable attention that in the Paleocene and Eocene epochs most of the known families of placental mammals exhibited varieties of molar patterns which are very plainly and demonstrably modifications of the primitive tritubercular type.

Fig. 4, A, B, represents an enlarged diagrammatic representation of an extremely primitive tritubercular lower left molar from its lingual and occlusal aspects. It belongs to an animal (*Phascolestes*) of the upper Jurassic period, order *Trituberculata*, a probable ancestor to all placental mammals. As will be noticed, the apex of the occlusal triangle as represented by the main cusp, the *protoconid*, is directed buccally; the other cusps forming the base are placed lingually; distally there is a *cingulum*, *heel* or *talonid*. In the upper molar, the cusp triangle is reversed; i. e., its apex presents lingually and its base buccally. The occlusion

\*In 1895, Prof. Osborn applied to the cusps of the human molars the system of nomenclature which he had invented at an earlier period for the molar patterns of Eocene mammals. It is to be regretted that this terminology was not adopted by the dental profession as it replaces such cumbersome terms as mesio-lingual cusp of the upper molar by the simple term, *protocone*, etc. (see Fig. 3). Moreover, "when we understand" Prof. Osborn contends, "that all the teeth of all placental mammals have this key, this tritubercular key, we can unlock the comparisons through the series and point out the homologies."

of this type of molar is of an interlocking or alternating character, and prevailed in the Mesozoic mammals. A living example representing this type of molar and occlusion is found in the Australian Marsupial Mole *Notoryctes*, Fig. 5, *A, B*. In this form of occlusion, the lower teeth are wedged into the triangular spaces between the upper teeth. The upper molar crowns constitute at this stage

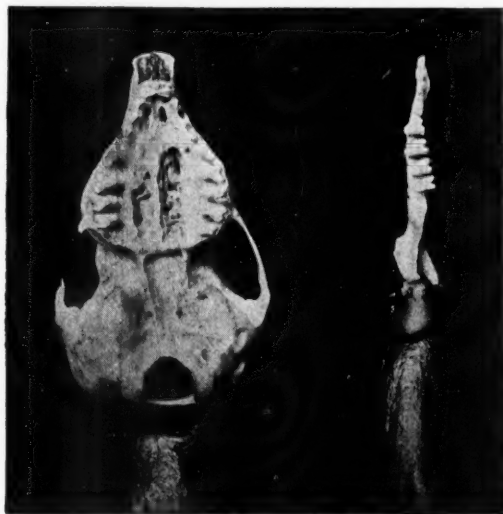


Fig. 5.—Dentition of Australian marsupial mole, *Notoryctes*. Occlusal view of upper and half of lower jaw, showing tritubercular type of molar in both. (Am. Mus. of Nat. History.)

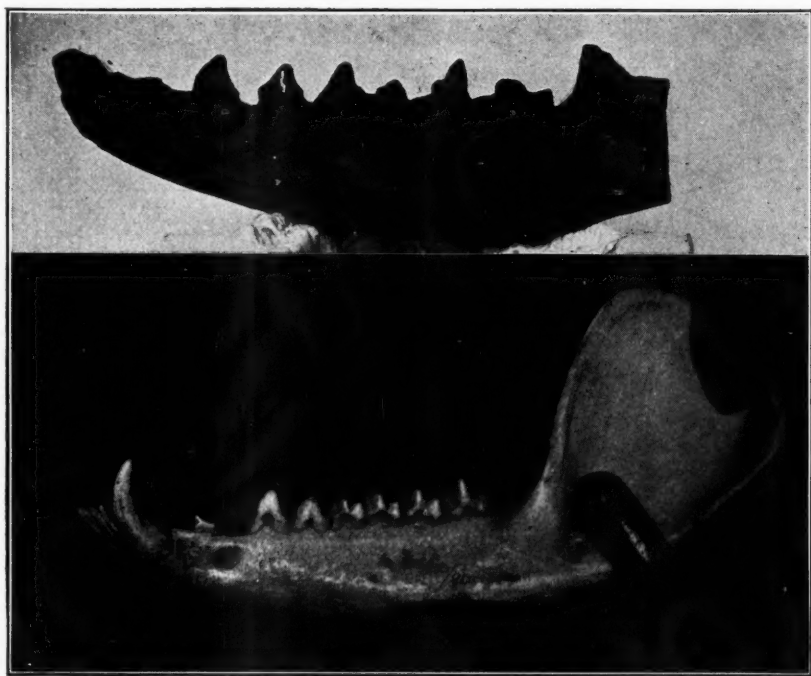


Fig. 6.—*A* and *B*.

Fig. 6.—Lateral aspect of lower jaw of (A) an Eocene carnivore (*Sinopa*) and (B) a modern omnivore (Opossum) showing the difference in the occlusal plane of the trigonid and the talonid in the molars. (Am. Mus. of Nat. History.)

chiefly a wedge, while the lower teeth besides contributing the wedge part, also present a posterior spur, or talonid, as seen in Fig. 4, *B* (*tal d*). This talonid is the starting point of the overlapping relation. We have thus, according to Gregory, in the evolution of occlusion, "first, *interlock*, and then, *interlock plus overlap*."

To elucidate, it must be explained that the part of the molar presenting the three cusps, called the trigon in the upper and trigonid in the lower, constitutes the wedge portion of the tooth. The posterior part, subsequently developed from the palatal cingulum on the upper molar, is called *talon*, while that portion developing from the spur on the lower molar is called *talonid*. The *talon* and *talonid* represent the lapping portions of the teeth in occlusion. In the lower

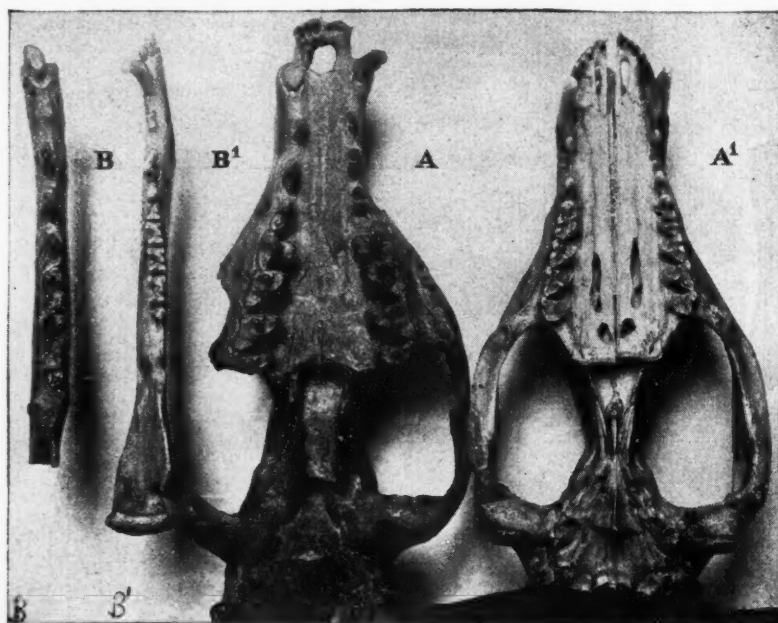


Fig. 7.—Dentition of Sinopa and Opossum. A.—Occlusal view of upper dental arch, showing tritubercular upper molar. B.—Occlusal view of left half of lower dental arch, showing tuberculo-sectorial lower molars. C.—Lingual view of premolars and molars in occlusion, showing protocone in the talonid fossa, and trigonid fitting into the triangular spaces between the tritubercular upper molars. A', B', C', the dentition of Opossum illustrating the same points as A, B, C, more clearly. (Am. Mus. of Nat. History.)

molar the trigonid, as may be seen in Fig. 6, is always on a higher plane than the talonid. The wedge-type molar relationship was reached in the age of reptiles (Secondary of Mesozoic era) while the lapping stage developed with the beginning of the age of mammals (Tertiary period or Cenozoic era). "In the more primitive mammals of the Eocene epoch, we find the normal tritubercular type in the upper, the lingual cusp of which is overlapped by the developed talonid. Thus, the anterior portions of the lower molars still fit into the spaces between the upper molars, but the posterior extension or talonid now overlaps broadly, so we have the stage of overlap well defined." (Gregory.) This type of lower molar, possessing the wedging portion (trigonid) and the lapping portion (talonid), was named by Prof. Cope *tuberculosectorial*. The sectorial part being the wedge-like trigonid and the tubercular part the talonid. "The tuberculosectorial type is the ground plan of which we still find traces in modern insectivorous, carnivorous, herbivor-



ous mammals and in primates. Figs. 7A, B, C, A', B', C' illustrate the dentitions and their occlusion of an Eocene carnivorous (Sinopa) and a modern omnivorous (Opossum) mammal in close resemblance of the teeth and occlusion.

2. THE FORM, NUMBER, POSITION AND OCCLUSION OF THE TEETH IN MODERN PLACENTAL MAMMALS

*The Molars.*—It is plainly visible (Fig. 7, C, C') how the mesial wedging portion (trigonid) of the lower molar fits into the space between the upper molars and how the distal lapping portion (taloid) overlaps the occlusal crown

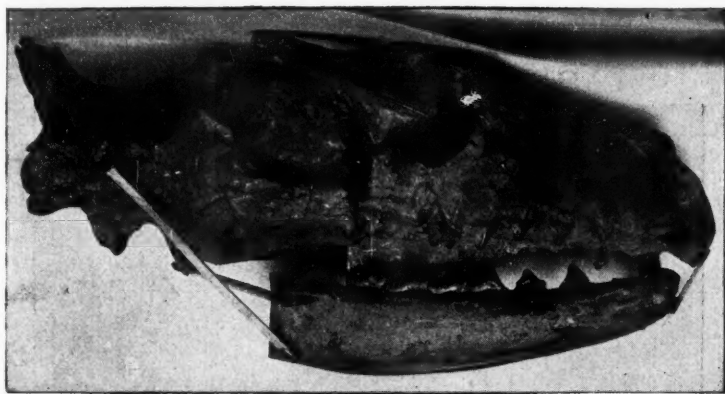


Fig. 7—C.



Fig. 7—C'

portion of the upper molars accommodating the lingual cusp (protocone) into its basin-like depression. The upper molars at this stage are still of the tritubercular type, the spaces between them being of considerable functional importance. For, possessing, as the tritubercular molars do, *cutting edges*, the marginal ridges connecting the trigonal cusps, and *piercing or crushing points*—the cusps, the wedge-type of occlusion enables them to constitute an efficient apparatus for flesh eating purposes. By modification of the cutting edges of the trigon and

trigonid in subsequent adaptation, the modern carnivorous specialization occurred. Thus the elongation of the *metacone-metastyle* portion in the upper last premolar and the modification of the *protoconid-metaconid* region in the lower first molars produced the carnassial adaption (Fig. 8, A, B). On the other hand the increase in size of the cusps, the broadening transversely of the upper molar crown and the development of the hypocone to the extent of obliterating the interdental space, produces the crushing tooth as may be seen in the Insectivora, Fig. 9, A, B. (*Gymnura*). In the crushing type, therefore, the points or cusps become predominant and the overlap of one part on another becomes accentuated so that it is now the occlusal surfaces of the crowns that oppose each other rather than the sides. This change consequently involves the modification of the wedge-shape triangular pattern into a quadrangular type of molar. Thus, even

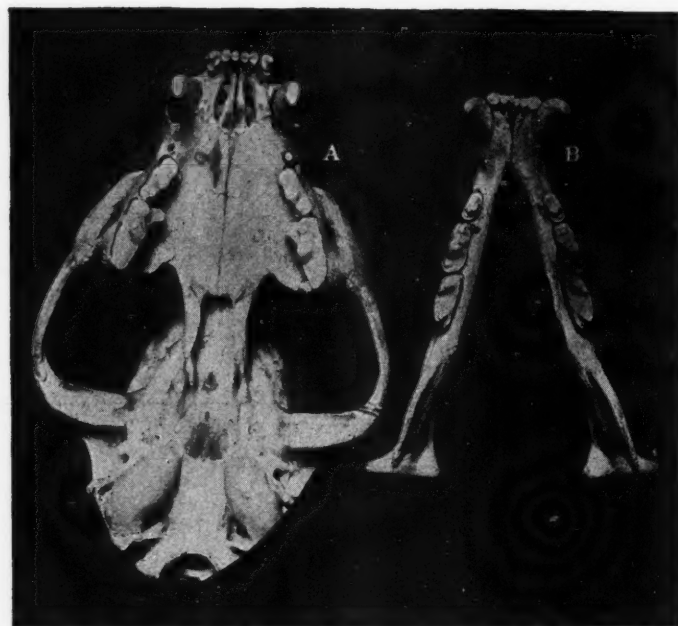


Fig. 8.—Dentition of Leopard. A.—Occlusal view of upper jaw, showing modification in form of premolars from the rudimentary (second) to the specialized carnassial (fourth), and the diminutive upper first molar. B.—Occlusal view of lower jaw, showing modification in form of the lower premolars and the first molar, the carnassial tooth. (Am. Mus. of Nat. History.)

in the quadrangular type the upper molar still possesses the primitive triangular pattern, but has in addition developed the disto-lingual cusp, the *hypocone*. The occlusion of this type of molar, then, presents these main features: the protocone of the upper molar is accommodated, as before, into the talonid basin (central fossa) of the lower molar, while the *hypocone* fits into that of the trigonid (mesial fossa). This form of occlusion best serves the purpose for the crushing and grinding type of molar. These, then, are the gross modifications in form of the molars in their evolution from the primitive tritubercular type to the sectorial, quadratubercular and tuberculo-sectorial pattern of modern placental mammals.

The change in position, though not as accentuated as that occurring in form, during the course of evolution, may, nevertheless, be classified in accordance

with the direction assumed by the mesio-distal axis, and manifested by the buccal surfaces. Thus, in the primitive triangular form of molar, the buccal surfaces of the upper teeth are arranged in an evenly aligned series, there being no buccal lapping or prominence. The position of the lower triangular teeth can not be described as they are separated from one another and do not form a continuous series. In the modern carnivorous modification, especially in the lower premolar-molar series of the Felidae, it may be noticed that the distal end of one molar laps the mesial portion of the tooth behind as is evident in Fig. 8. (Leopard.) And last, in the quadritubercular, square type of tooth, the condition is reversed; namely, while there is no actual lapping, the mesio-buccal angle of the molar or of the molariform premolar projects buccally beyond the disto-buccal angle of the tooth in front of it. (Fig. 9A.) These, though primitive features regarding position, persist as we pass through the various orders of mammals.

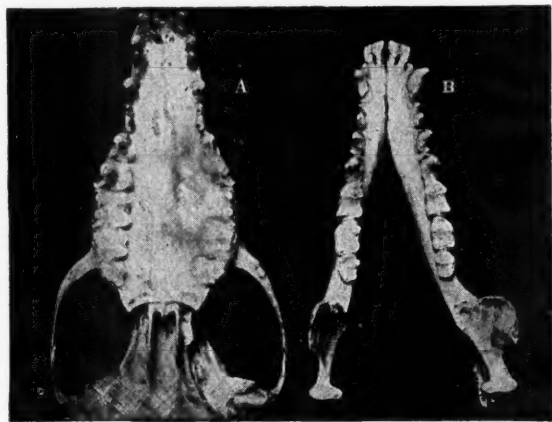


Fig. 9.—Dentition of *Gymnura*, Insectivore. A.—Occlusal view of upper jaw showing development of quadrangular, quadritubercular upper molar for crushing purposes. The interdental spaces are obliterated and the mesio-buccal cusp is more prominent buccally than the disto-buccal of the molar anterior to it. B.—Occlusal view of lower jaw, showing full complement of cusps on trigonid and talonid, difference in form and arrangement of incisors as compared with those in the upper jaw. The premolars in both jaws varying from caniniform first to molariform fourth. (Am. Mus. of Nat. History.)

Another change in position may be noticed in the longitudinal axis of the molar teeth; thus, whereas the occlusal surfaces of the primitive tritubercular molars and those of the lower modern placental mammals are directed inward in the upper jaw and outward in the lower jaw, this direction is reversed in the anthropoids and man, the crowns of the lower molars being tilted inward (lingually) and those of the upper outward (buccally).

*The Incisors.*—The incisors of the insectivore, (*Gymnura*), Fig. 9, A, B, present different forms in the upper and lower jaws. In the upper they are round, pointed pegs, while in the lower they resemble very much the worn lower deciduous human canine, but considerably smaller, increasing in size mesio-distally. The position of the incisors in the upper arch is almost parallel on the two sides, they are widely spaced, and their long axis vertical; in the lower jaw they are placed in a sharp curve and are considerably procumbent in their long axis. There are intervals or spaces between the centrals, larger in the upper than in the lower.

In the Opossum which in dentition is a little changed survivor of the most primitive marsupial of the age of reptiles, the upper incisors are very much diminished in size and in form they resemble those of the lower in the Insectivora. They are all of the same size, the centrals separated and pointing toward each other mesio-incisally. Their horizontal position is more like an obtuse angle, the angle being in the central incisor region and the sides formed by the four incisors on either side. They are also axially vertical to the occlusal plane. The lower incisors are long and slender, resembling more the teeth of a comb though more round, and the tip is capped by an enamel covering. They are very procumbent, arranged in almost two straight lines, meeting at an angle in the symphyseal region.

The incisors of modern Carnivora, in the Felidae (Fig. 8) for instance, resemble considerably the form of the human lower deciduous canines. The centrals are extremely small and the others increasing in size mesio-distally so that



Fig. 10.—Dentition of Badger (*Toxidea Americana*). Front view, showing caniniform incisors and lingual position of lower second incisor. (Am. Mus. of Nat. History.)

the third has always been described as *caniniform* in appearance. They are arranged in a straight line transversely, probably best to subserve their purpose of tearing the flesh from their prey. In the Mustelidae (Fig. 10) the incisors are decidedly caniniform, the second situated more lingually than the others. They are of the same size and interlock in occlusion.

In the Herbivora they reach two extremes in form as they do in number and position. Thus, in the Artiodactyla (the even-toed ungulates) they acquire a broad and flat shovel-like shape in the lower jaw while in the upper they are missing, as in the Pecora (sheep, cow, etc.). In the Perissodactyla (odd-toed ungulates) they are also broad but more stout, of considerable difference in their anatomy, and are present in the upper jaw as well. In both orders, they are arranged in a broad but even curve, the lower incisors assuming a procumbent position, while the uppers are more vertically placed. In the Camel, the lower incisors are very flat with a sharp cutting edge lapping one another considerably.



The *Rodentia* again exhibit a complete modification in the incisor region. The number being reduced to  $\frac{1}{1}$  except in the *Duplicidentata*. The incisors are long, curved, and possess a chisel-like edge. Enamel covers them only labially and proximally, and they possess a persistently growing root. In the *Duplicidentata* (rabbits, hares and picas) there is also a lateral incisor present. Its form is that of a fine peg, and its position is lingually to the central Fig. 11 (Rabbit). In all placental mammals, the occlusion of the incisors appears either in an edge-to-edge bite as in the *Insectivores*, *Carnivores* and *Perissodactyls*; or in an overbite as in the *Rodents* when the molars are in occlusion. In the *Lemurs*, the incisors are not in occlusion, but rather present an open bite.



Fig. 11.—Dentition of *Rodent*. Occlusal view of upper jaw of Rabbit, showing position of lateral incisor lingually to the central. (Am. Mus. of Nat. History.)

*The Canines.*—The Canines vary considerably in their morphologic aspect, so as to range from their entire absence, as in the *Rodentia*, through the vestigial appearance in certain ungulates to the enormously sabre-like structure in the sabre-toothed tiger or, in the wild boar. In some mammals, they become incisi-form; as in the *Pecora* (certain Deer, Antelopes, Sheep, Cow, etc.) in others they assume the incisor position and function as in some of the *Lemurs*, Aye-Aye, (*Daubentonia madagascariensis*).

*The Premolars.*—The premolars also vary extremely in form, as may be seen in carnivora Fig. 9A the p 2 having the vestigial appearance of a truncated

cone, without any functional importance, while the *p 4* is transformed into the carnassial tooth, which is of greatest functional significance. Again in the Ungulates, especially in the Perissodactyla, they so completely resemble the molar in form and proportion as to be indistinguishable from them, excepting premolar 1 the *wolf-tooth*, in the horse which is a deciduous tooth, and is more caniniform. Their position is as erratic as their form but in the main they follow the position of the molars, with modification in accordance with the form of the alveolar arch.

To sum up what has thus far been discussed, the following points may be emphasized:

1. That the dentitions of all placental mammals have sometime in the course of their evolution passed through the *tritubercular molar* stage.

2. That while all placental mammals have started out with the same molar pattern, they have evolved such divergent types as to produce the extremes seen in the carnivores, ungulates, and insectivores.

3. That with the modification in form of the molars into the cutting and grinding types, the mesio-distal axis is also changed in dimension and position.

4. That despite the great diversity in form of the molar pattern of the modern placental mammals, the occlusion remains fundamentally the same.

5. That the antemolar teeth also assume positions in accordance with their form and functional adaptation, the incisors especially presenting the edge-to-edge or the overbite occlusion.

6. That although the various placental mammals have started out with the same dental formula  $\frac{3, 1, 4, 3}{3, 1, 4, 3}$  they have reached a stage of such divergence as to present at one extreme no teeth at all (the Great American Ant Eater) and at the other the full mammalian complement of teeth (the Horse).

And, finally, that manifestations which might have been considered as anomalies have gradually become normalities. Chief among the normal anomalies are:

- a. Lapping of lower incisors in *Camels*.
- b. Lingual position of second lower incisors in Mustelidae (*Badger*, *Martin*, *Sea Otter*, etc.)
- c. Position of upper lateral incisors behind the centrals in Duplicidentata (*Rabbits*).
- d. Assumption of incisor form by lower canine in Pecora (Cow, Deer, Sheep, etc.).
- e. Assumption of incisor position and function by the lower canine in some Lemurs (*Aye-Aye*, *Daubentonia madagascariensis*).
- f. Development of second upper incisor to enormous proportions in some Proboscidea (*Elephants*).

(To be continued.)

## LINGUAL LOCK

BY DR. J. B. KOHAGEN, DULUTH, MINN.

**A**FTER using a lingual arch on a number of cases, it occurred to me that with present locking devices it was rather difficult to avoid considerable play or movement in the anterior part of the arch. This movement seemed to increase after a number of removals of the arch which no doubt was due to a slight wearing of surfaces of the lock.

I also found that as soon as my patients were aware of any arch movement it encouraged them to manipulate it with their tongues until they appeared at the office with arches very much distorted.

It seems to be difficult to construct a single tube lock that will hold an arch rigidly. It has also been my experience that there is a variation in the size of the half-round tubing and wire which we purchase from the manufacturers that makes it difficult to keep the arch rigid.

The device which I am about to describe is practically a doubling up of the half-round wire and tube lock as used by Dr. Mershon.



Fig. 1.



Fig. 2.



Fig. 3.

Fig. 1 shows half-round tubes soldered to molar anchor band.

Fig. 2 shows half-round wire soldered to 19 gauge arch and T lock wire. For the shank of the T wire I use 21 gauge gold wire, this stands repeated bending without breaking. The cross piece of wire which locks under the tubes is 21 gauge Ney Oro wire.

Fig. 3 shows the arch in position with lock bar under the tubes. It might occur to you that there would be some difficulty in keeping the tubes and half-round wires aligned, but in answer to that thought, will say that I use no device whatsoever, just a case of free-hand soldering. This lock you will find will hold the arch wire very rigid on account of the greater bearing surface of the arch on the tubes and is still compact and comfortable in the mouth.

With a single tube any movement whatsoever in the lock will cause considerable movement in the anterior part of the arch but with the double tubing and the lock bar drawn into place the arch is brought to bear on both tubes, affording a greater bearing surface, thereby preventing any movement.

## DEPARTMENT OF ORAL SURGERY AND SURGICAL ORTHODONTIA

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### REMOTE MANIFESTATIONS OF FOCAL DENTAL INFECTIONS, WITH CASE REPORTS\*

BY RICARDO FERNANDEZ

*Assistant Professor of Roentgenology, University of the Philippines, and  
Chief of the Department of Physical Therapy, Philippine*

*General Hospital*

IT IS a common practice in the treatment of certain articular and muscular affections of various types to make clinical and laboratory examinations with a view to determine the presence of so-called chronic rheumatism, acute rheumatic fever, or uricacidæma or gout; hence the custom of requesting urine examination to enable the practitioner to determine the total amount of uric acid, and also to estimate the quantity contained in the blood. An elaborate medical and dietetic treatment is then given, coupled sometimes with physical therapy, but in the majority of instances such treatment is a failure.

There is no pretention of originality in my paper; the motive that induced me to prepare it was to suggest to my confrères that in such affections they may depart from the line of investigation heretofore followed.

Sinclair Tousey, in the preface of his monograph on "Roentgenographic diagnosis of dental infection in systemic diseases," mentions the observation on the wife of an eminent jurist, who died as a result of an infection localized in the socket of a tooth; this focal infection was diagnosed rather late by means of x-ray. He says:

"The widest publicity should be given to the fact that greatly varying and sometimes serious or fatal systemic diseases and those affecting remote organs are often due to infection connected with the teeth or with the pneumatic sinuses

\*Read before the Manila Medical Society December 3, 1917. Published by permission of the Bureau of Science of the Government of the Philippine Islands.



of the face. The infected foci are discoverable by the x-rays. Some of these cases are cured by treatment of the oral lesion and some require also autogenous vaccination with a bacterial culture from the pus in the oral lesion."

Hardly any importance has been given to alveolar abscesses as possible causes of serious and remote disorders in the body; although it has always been considered important to detect the presence of pus in any region of the body, so as to account for, sometimes, the whole group of symptoms in certain isolated clinical cases. The reason why due consideration has not been given dental infections is that we have been treating morbid conditions; symptoms and their clinical course we never thought might have an intimate relation with dental lesions.

The researches of E. C. Rosenow and of Frank Billings, confirmed later by Hartzell and by others, as to the relation of various pathological manifestations to chronic dental infections, have been the guide of radiologists, dentists, physicians, and laboratory workers. In consequence the medical literature has been enriched by enough data to enable us to form a clear and exact idea concerning the intimate relation existing between chronic dental infection and certain forms of arthritis, neuritis, neuralgia, various types of rheumatic manifestations, and certain pathological conditions in the stomach, the duodenum, the appendix, the gall bladder, the heart, and the kidney, and blood diseases such as pernicious anæmia, etc.

Taking into consideration the fact that the manifestation of chronic dental infection cannot generally be diagnosed with accuracy by any clinical means without the x-rays—and even with them in certain cases with difficulty—I will first deal with the two main dental infections that commonly bear relation to the morbid manifestations mentioned; namely, the apical and periapical abscess and pyorrhea alveolaris. As a routine in our dental radiograms we employ the extraoral method with photographic plates and, exceptionally, the intraoral by means of photographic films and plates of proper dimensions to be placed within the mouth. We deem the extraoral method more practical, inasmuch as it enables us to obtain, not only a large number of teeth, but certain information concerning both maxillæ, especially the upper, in its relation with the nasal cavities and the maxillar sinuses.

With a well-conducted technic, we are able to make a complete exploration of both maxillæ, and their respective teeth, by five exposures, whereas twelve at least are necessary in the intraoral method—six exposures for the inferior—provided that every one of the exposures is satisfactory.

In order to save time on one hand, and to avoid the patient being unduly exposed to the x-ray on the other, we decided to use the extraoral in preference to the intraoral.

We use the oblique projection technic recommended by Drs. E. Speder, J. Belet, and J. D. McCoy.

With this technic we succeeded in exploring all the teeth and the maxillæ, and thus could detect any change from the normal appearance of each particular tooth.

In the interpretation of the x-ray plates, for the detection of apical abscess, one must bear in mind the relation of the natural cavities as, for instance, the

antrum of Highmore with the superior molars; the nasal cavity with the superior incisors; and the foramen of the inferior maxilla with the inferior premolars. Otherwise, any one of these natural cavities might be wrongly taken as a shadow produced by an abscess, and thus we might give an erroneous diagnosis, with serious consequences. With the foregoing precaution, it is relatively easy to diagnose with accuracy any abscess that might develop in the dental apex or around it, even though there are no clinical symptoms, if the negative shows a dark area circumscribed in the dental apex or in the alveolar cavity, and if this dark area is well defined and sharply separated from the neighboring tissue by a line of demarkation.

This dark area, a very characteristic radiogram of an abscess, is produced by diminution of density, or decalcification and sometimes destruction of the dental tissue. If the dark area is very pronounced, almost black, we can infer the probable presence of pus in the alveolar cavity. It has been proved that the pus may become fluorescent under the influence of the x-rays, and this fluorescence acts as an intensifier of the radiations acting upon the point or site where the abscess is located, and as a result we observe the very pronounced dark zone in the negative.

Pyorrhea alveolaris, or Rigg's disease, is clinically demonstrable; it is nevertheless wise to remember that the presence of pus around the external border of the gums is not always due to Rigg's disease. A careful examination will sometimes disclose the cause as being the presence of calcereous deposit around the teeth, which may act as an irritant upon the gums and give rise to suppuration.

Clinical examination, aided by the x-ray, makes diagnosis certain in cases of dental infection, and at the same time the extent of the lesion may be determined in this way.

T. L. Gilmer and A. M. Moody are not in accord with Dr. C. J. Grieves, of Baltimore, and Dr. W. S. Baer, of Johns Hopkins University, that *Staphylococcus albus* or *S. aureus* may be the causative agent of apical or periapical abscesses. Through experiment Gilmer and Moody have been able to identify the preponderance of streptococci in aerobic and anaerobic cultures, aseptically obtained from pus in the foci, or the seat of acute, chronic, or latent infections in the maxillae and teeth. *Streptococcus hemolyticus* was found in acute abscess; *S. viridans*, in chronic; and *S. mucosus* was obtained only once.

Occasionally *Staphylococcus albus* and *S. aureus* have been isolated by some observers in aerobic cultures, and also *Micrococcus catarrhalis* and some other unidentified saprophytic microorganisms. The streptococci in the anaerobic cultures are rarely obtained pure. Some cultures showed the presence in large numbers of *Bacillus fusiformis*, while in a few test tubes there were found pure cultures of this bacillus. C. C. Bass and F. M. Johns give as a specific cause of alveolodental abscess the *Entamoeba buccalis* and possibly other species that infect and destroy the peridental membrane.

While Hartzell and Henrici do not claim in their experiments that the streptococcus is an etiological factor in dental abscesses and in *Pyorrhea alveolaris*, nevertheless from the standpoint of metastatic abscesses they think it is of paramount importance that such microorganisms are constantly present in lesions with ulcerated surfaces; and they probably do invade deeper tissues and gain entrance into the circulatory channels.

Henry L. Ulrich says that out of one hundred seven cases of dental abscesses with bacteriological examination in the Minnesota Hospital, one hundred showed the presence of *Streptococcus viridans*; and out of fifty-two of his private cases, fifty also showed the presence of the same microorganism. They were also found with the above microorganisms, *Staphylococcus albus*, *S. aureus*, and *Micrococcus catarrhalis*.

Hartzell, Henrici, and Leonard, in their posterior researches, made the assertion that they found streptococci in periapical abscesses and in pyorrhea, and that these streptococci give rise in animals to inflammatory lesions in the cardiac muscle, vegetative growth in the valves, articular infection, inflammation of the blood vessels, and focal and diffuse infection of the kidneys. Similar lesions were observed in human beings upon autopsy, and these investigators believe that the lesions mentioned were caused by streptococci.

Recent bacteriological investigations carried out in the department of medicine of the University of Minnesota disclosed the constant occurrence of *Streptococcus viridans* in chronic dental abscess and pyorrhea; and, although *Entamoeba buccalis* was also found in oral infections, this is not recognized as the cause of pyorrhea, as Bass and Johns claim.

It is a scientifically proved fact that the gastric juice is not a barrier against the passage of bacteria and pus into the stomach and the intestines. Microorganisms in the mouth may be swallowed, as actually happens, and they reach the stomach without all of them being destroyed, and thus gain entrance into the intestines, causing under certain conditions throughout their course local affections such as gastric ulcer, appendicitis, etc.

Another route of dissemination from mouth infection is by way of either the lymphatic or the circulatory channels; hence the presence of focal infections of remote origin, as Hartzell, Henrici, and Leonard have shown in their clinical investigations already referred to.

There are localized infections of the tonsils, and others, that may coexist with pyorrhea and dental abscess; treatment for their eradication does not cure the disease if not properly attended to.

A thorough treatment of the teeth by the dentist, with extraction if necessary, was enough to eradicate all symptoms and other disturbances observed in patients. In instances where a conjoined local treatment by the dentist and the use of vaccines by the physician were available, improvement was rapid, especially when autovaccines were employed.

L. S. Medalla thinks that there is room for vaccine therapy in all cases of acute and subacute dental abscesses; and that, by the employment of this method, a good deal of suffering among patients and the loss of their teeth have been avoided.

In the use of autovaccine the necessary precautions must be taken to obtain the purulent material aseptically, without contamination. An autovaccine prepared under such conditions almost invariably brings about a surprising and rapid disappearance of the symptoms, which may not be observed if one is careless in the preparation of the vaccine.

Hartzell and Henrici believe that the elimination of the focal oral infection is very much more important than the use of vaccine, and they consider this as a mere adjuvant treatment in some cases.

The limited number of cases observed by me corroborate the facts which I have quoted here, in regard to the treatment.

*Case 1.*—W. T., adult, American, married, male, suffering for some time from lumbosacral and articular pain, the character and intensity of the former simulating nephritic colic. He looked very pale. Radiograms taken in the lumbosacral region showed the characteristic evidences of beginning *Arthritis deformans*. Radiogram of the teeth showed the evidence of pyorrhea in the only remaining molar in the lower mandible, right side, and abscess in the second upper bicuspid, left. Under appropriate treatment of the affected teeth, the hygienic care of the mouth, he improved markedly, and the painful symptoms disappeared. Recovery was slow, and there was left some rigidity in the knees on account of the definite lesions observed in the articulations.

*Case 2.*—F. L., adult, Filipino, male, married, complaining for many months of polyarticular rheumatism with acute exacerbations which prevented him from attending to his ordinary work. The medical and the dietetic treatments as well as the hydrotherapy given him afforded very little relief. Apparently his teeth were in excellent condition, but a radiogram showed the presence of an abscess in the remaining molar in the inferior maxilla, right side. Treatment of the dental abscess without any other medicine caused the gradual disappearance of his symptoms, and in four months he was completely cured.

*Case 3.*—C. de C., female, Filipino, married; she gave a history of some rheumatic pain; for two months she had been complaining of intense pain in the lumbosacral region, radiating to the left thigh. She was bedridden, and could neither sit nor walk. All previous treatment usually given in such cases was a failure, and the intense pain could be abated only by morphine injection. Radiograms of both kidneys and ureters were negative for stone; the vertebral column and the whole pelvis were entirely normal. Radiogram of both maxillæ showed the presence of abscesses in both first molars in the superior mandible. Both molars were extracted under anæsthesia, and cultures of *Micrococcus viridans* and *Staphylococcus albus* were obtained. Autovaccine was prepared and all other treatment previously given was suspended. The first injection given was 33,000,000; on the third day she was given another of 50,000,000. On the day following the first injection there were observed dizziness, nausea, and pain in the teeth, worse on mastication and on drinking cold water. On the sixth day after the first injection she was given another of 50,000,000, and thereafter 100,000,000, at two-day intervals. After the third injection there was abatement of the symptoms observed after the second one and, to her surprise, she was able to sleep and to move her lower extremities freely. After the sixth injection the patient was able to sit up in bed without any trouble; after the eighth, she could walk alone. Her general condition improved, and she was finally cured very rapidly.

*Case 4.*—M. de F., adult, female, Filipino; with previous history of some rheumatic affection, and complaining of intense pain in the left shoulder. The radiogram of the shoulder showed evidence of *Arthritis deformans*. She received medical, dietetic, and electric treatment with no improvement. I suggested that an x-ray picture be taken of her teeth, and the radiogram showed an abscess in the first bicuspid, right inferior maxilla, and abscesses also in both bicuspids,



superior maxilla, with pyorrhea in the lower incisors. Culture taken from the pyorrhea was positive for *Micrococcus viridans*. Autovaccine was prepared, and injections of it ameliorated her symptoms, and complete improvement is expected when her teeth will be entirely cured as she is at present under the care of a good dentist.

Case 5.—P. J. C., adult, European; suffering from articular manifestations for twenty years. He was always under dietetic and medicinal treatment, without showing real improvement. Radiogram of both maxillæ positive for pyorrhea in the last molar, left lower maxilla, and abscess in the last two molars, left inferior maxilla, with pyorrhea in the second false molar and the first molar, superior maxilla, left side. The two inferior molars were extracted and the culture taken was positive for *Micrococcus viridans*. Vaccine was prepared and after the second injection the patient was able to wear his shoes, and he experienced no trouble on walking.

Case 6.—V. de C., adult, Filipino, female; with previous history of rheumatism following an attack of paratyphoid fever. Ever since she has been having fever with temperature between 38° and 39° and occasionally as high as 40°. All the intestinal symptoms of paratyphoid have disappeared, but there is persistence of some articular pain. There is no indication of any tuberculous lesion. Radiogram of the teeth shows evidence of pyorrhea in the false molar and the molar supporting a bridge in the inferior mandible, right side; pyorrhea in all the false molars left side, upper mandible, and also in the two false molars and the first molar, right side, upper mandible. Extraction of the false molars and the true molars, which were quite movable in their sockets, was followed by the disappearance of fever, though later the fever recurred, but in a very slight degree. Culture was positive for *Micrococcus viridans*. Autovaccine was prepared and injections were given, with gradual and complete disappearance of fever.

Case 7.—M. V., adult, Filipino; suffering trifacial neuralgia, right side, for some time. All medical and electric treatment given in Europe was of no avail. There was improvement but never a cure. Radiograms taken show evidences of pyorrhea in the false molar and canine, right side, inferior maxilla. These teeth were extracted, and culture taken was positive for *Micrococcus viridans*. As a result of injection of the autovaccine the intervals between attacks of the neuralgia are longer and the pains less intense. Patient is at present under treatment and observation.

Case 8.—M., adult, Filipino, male, married; with previous history of rheumatic pain and venereal disease, very suspiciously like syphilis. He has been suffering for a long time from periodical attacks of trifacial neuralgia, severe in character. He received the usual treatment for trifacial neuralgia, and mercury injections for suspected syphilis. Treatment was a failure. On examination, his teeth were found to be in very poor condition. Radiogram shows evidences of pyorrhea in the upper bicuspid, right side, and an abscess of the first molar, lower right. Once the pyorrhea and the abscess were treated, he made a complete recovery.

Case 9.—V., adult, Filipino, married; with previous history of rheumatic pains with acute exacerbations, only relieved by salicylate treatment, but the

symptoms never disappeared entirely. Radiogram showed the presence of an abscess in the false molar, and pyorrhea in some of the teeth. Local treatment of the pyorrhea and the abscess, and autogenous vaccine, resulted in a complete cure.

Case 10.—J. L., adult, Filipino, married; complaining of acute inflammation of the joint of the right shoulder. Mouth in a very bad condition, with evidences of pyorrhea. Former treatment for arthritis of no avail. He could not use or move his right arm on account of pains. Polyvalent vaccine was prepared, and after three successive injections of 100,000,000 each, there was observed marked diminution of the inflammation. Ten days after treatment the patient was able to use his right arm.

The cases above reported, and those under my observation and treatment, are certainly very few from which to draw conclusions; but examination of the history of the cases reported will show that the results obtained from the therapeutics followed by me fully accord with the outline of treatment discussed. Therefore, as the symptoms disappeared with the disappearance of the focus of infection, the symptomatic manifestations observed were related to the dental infections discovered.

In cases where cultures were made, *Streptococcus viridans* associated with *Staphylococcus* was obtained in one case (3); and in the others, only *Streptococcus viridans* was found. Vaccine of 100,000,000 per cubic centimeter was prepared from the microorganisms obtained from each patient.

Patients treated by the cure of affected teeth or by simple extraction showed gradual recovery, while those who received local treatment, associated with vaccine therapy, recovered more rapidly.

In Cases 9 and 10, the use of vaccine therapy, with polyvalent vaccine, gave positive results when associated with local treatment of the infection.

I wish to express my appreciation to Prof. A. G. Sison for his courtesy in making the English translation of this work and for furnishing bibliographical references; to Prof. Jose S. Hilario for the preparation of vaccines; and to Dr. A. de Asis for his valuable coöperation as a dentist.

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# DEPARTMENT OF DENTAL AND ORAL RADIOGRAPHY

Under the Editorial Supervision of

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It is the object of this department to publish each month original articles on dental and oral radiography. The editors earnestly request the cooperation of the profession and will gladly consider for publication papers on this subject of interest to the dental profession. Articles with illustrations especially solicited.

## SOME RADIOGRAPHIC ANOMALIES

BY JOSEPH POLLIA, M.D.,

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San Francisco, Cal.*

THE anomalies as illustrated and described may prove interesting. It is to be regretted these particular abnormalities do not show up more clearly. Case 1 came into my office with an acute conjunctivitis of the left eye. A prominent eye man ordered x-rays of the teeth and the third molar was extracted. After three days no appreciable change was seen in the condition of the eye. On reviewing the x-rays, which were brought in, I ordered the cleaning up of the edentulous area adjacent to this molar.

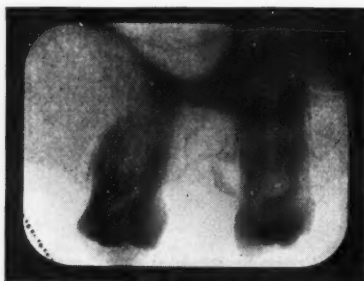


Fig. 1.—Infraorbital foramen.

You will note that there is an area over the buccal root of the molar which was extracted. This was diagnosed as an abscess. After cleaning out the designated area, the condition immediately improved. The question now, from the point of radiographic interpretation, is, "Should the third molar have been extracted because of the area at the apex of the buccal root?"



Close scrutiny will show that the peridental membrane shows no increase in size at this point. The peridental lamella or linea dura is intact and in close relationship throughout. Therefore, said area can not be pathologic. We note that the molar shadow is thrown over the apices of this molar and the only anatomic orifice radiographically possible with this relationship, is the infra-orbital foramen.

Radiographic diagnosis: Infraorbital foramen; of course it is surmised in this particular case that the rarity of this anatomic shadow of radiograms in the molar regions, was responsible for the extraction of the tooth.

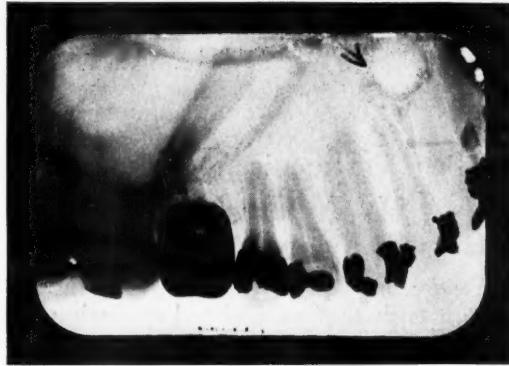


Fig. 2.—Anterior palatine foramen.

Case 2.—There is an area of radiolucence over the right central rather dimly shown. This central was, however, not extracted, due to the timely advice of one of the Board of Directors who was called in hasty consultation. It was his opinion that this was the anterior palatine foramen. On being presented to me, I agreed that such was the case.

## **ABSTRACT OF CURRENT LITERATURE**

**Covering Such Subjects as**

**ORTHODONTIA — ORAL SURGERY — SURGICAL ORTHODONTIA — DENTAL RADIOGRAPHY**

It is the purpose of this JOURNAL to review so far as possible the most important literature as it appears in English and Foreign periodicals and to present it in abstract form. Authors are requested to send abstracts or reprints of their papers to the publishers.

### **The Road of Vision in Orthodontia. Hoggan. Journal of the National Dental Association, May, 1920, vii, No. 5.**

Orthodontia as shown by Angle rests upon normal occlusion. The latter, however, is a means to an end not the end in itself. Efficiency in natural occlusion is low in comparison with that of assisted occlusion. The real goal is good function. Some have restricted the services of orthodontia to the eruptive period but this so-called legitimate field is an ideal. Orthodontia is more than harmony between the teeth, it is harmony between the jaws and the face as a whole. But a disharmonious face is not necessarily dependent on malocclusion. When a mother asks that her child grow up with a Harrison Fisher or Dana Gibson chin she may be asking for a disharmonious face. It is not impossible to produce such a result but in many faces it would be quite out of place. The hidden influence of a dental training in early life is according to the author shown in the fact that one of the greatest of our anthropologists and one of our leading artists both began life as dentists. The author gives a description of his method of measuring teeth in connection with the practice of orthodontia.

### **Prophylaxis and Radiology in the Practice of Orthodontia. Casto. Journal of the National Dental Association, May, 1920, vii, No. 5.**

The author by prophylaxis refers to the preparation of the mouth before any orthodontic apparatus is worn. The buccal cavity is put into the best possible condition by the usual resources. The orthodontist proper does not, of course, do this work himself; it is either turned over to an assistant or the patient is referred to his regular dentist or asked to consult one who does periodontia. In regard to orthodontic apparatus bands should be so applied that the periodontal tissues will not be injured. The patient consults the orthodontist every two weeks while under treatment, while prophylactic treatments are carried out every six weeks and orthodontic apparatus removed at the end of six or eight months. In regard to radiology the author is aware that orthodontists do not as a class realize what they can do to promote their art. He has convinced himself of this usefulness after a period of indifference to radiology. He has the x-rays made in his own office by a technician, not necessarily a dentist. The films may

be developed while the patient waits. The plates show many interesting and unsuspected conditions. We get an idea of the missing and unerupted teeth. By missing teeth are meant any which are congenitally absent. Pulpless teeth are also checked up.

**Interpretation of Angle's Classification of Malocclusion, Etc. Hellman. Dental Cosmos, April, 1920, lxii, No. 4.**

Examination of 800 cases of malocclusion has shown that in a very high percentage of cases the upper molars are rotated. This rotation seems to occur in such a manner as to bring the buccal cusps into an even buccal plane with the rest of the teeth. It seems to affect the position of the mesio-lingual cusp in such a manner as to influence its occlusion mesio-distally in a very slight degree, while the buccal cusp may at the same time appear in a decided malposition. It shows therefore that the pivotal point of rotation of the upper molar is in the region of the longitudinal axis of the lingual cusp. Secondarily it demonstrates that the effect of such deviation is to allow the mesio-buccal cusp to assume a more mesial position than that of the lingual cusp, thereby leaving the mesio-lingual cusp either entirely in its primitive relation, or to move considerably less mesially than the buccal cusp. Therefore in most distal occlusion the mesio-lingual cusp of the upper molar will be more nearly in its primitive relation while its relation to the central fossa of the lower molar in occlusion is the last vestige of the primitive occlusion to be severed in the transition toward malocclusion. Hence to secure a correct classification of occlusal anomalies we should eliminate from consideration the buccal aspect of cusp relationship and substitute the lingual cusps of the upper molars and the occlusal fossæ of the lower molars, these, constituting the most primitive landmarks of occlusion still persisting in human dentition.

**Mutilating Extractions of Milk and Permanent Teeth. Oppenheim. Wiener Vierteljahresschrift für Zahnheilkunde, October, 1919, xxxv, No. 4.**

The author first mentions Angel's theory of occlusion which has more or less modified our former attitude on extraction of teeth. Black has also shown by the dynamometer that artificial teeth exert but feeble pressure in mastication. Everything points at present to the necessity of retaining the natural teeth. Extraction may be followed by a series of deformities. One of the most familiar is the elongation of a tooth after its opposite has been removed. In the case of the milk teeth mass extraction is quickly followed by elongation of both the antagonistic teeth and the alveolar process, although it is denied that such elongation is seen in the lower jaw. But this form is only one of many, so that in the compass of a short article only a few of the most crass examples can be quoted. Extraction of labially erupted canines very often is followed by deformity which might have been averted by proper cosmetic treatment. Extraction of these teeth causes falling in of the upper facies and may even give rise to an appearance of toothlessness. The subject looks apathetic and prematurely old. These marked changes result from so small a cause as atrophy of the canine alveoli and the pressure of mastication is transferred from its normal bearings with disastrous results. In the case of unilateral extraction of these canines

the face shows marked asymmetry. The author mentions compensatory extractions which help to offset in a measure an unwise or necessary first extraction but some authorities appear to condemn these symmetrical extractions as without a preponderance of advantage. Modern orthodontia is antagonistic to all extraction and is constantly limiting the field of the latter although this must often be a matter of prophylactic activities.

**Changes in the Dental Arch During Childhood. Sir Frank Colyer. Dental Record, May 1, 1920, xl, No. 5.**

The author cites passages from the writings of Hunter and Tomes which are not in accord with his own observations. He cites the cases of three children which he has followed from the age of three years. All were breast fed and free from nasal obstruction and there was no history of any treatment for adenoids or enlarged tonsils. Measurements were made between the canines and deciduous second molars with a special apparatus which is more refined than the use of plaster casts. These measurements were repeated at intervals until the ages of 11 or 12 and curves were plotted. Both jaws were subjected to this study. The diagrams on millimeter paper show a rapid increase in intercanine width between the age period 6 to 8 which corresponds to the eruption of the permanent incisors. There is also a more regular increase in width between the deciduous second molars. The maxima in each case was about the same—3mm. for the canine interspace and 3.1 mm. for the space between the molars. In the case of a fourth child in whom the teeth were somewhat crowded the causation of the latter was not learned. In all four children the width of the arch increased between the ages of 4 and 11 and in the abnormal arch the crowded condition of the deciduous teeth suggests that there was interference with growth during the first four years of life. The author believes that the development of the permanent teeth enlarges the arch but the mechanism is not clear. This may be a widening of the premaxilla which is seen sometime before the sixth year. In any case well marked sutures in the maxilla usually correspond to a well developed arch, while indistinct sutures are associated with crowded teeth. Early closure of sutures appears to mean underdeveloped arches.

**Surgical Removal vs. Extraction of Infected Teeth. Robert Burns. The Dental Cosmos, 1920, lxii, No. 3.**

Dead, devitalized, abscessed, and pyorrheic teeth should never, according to the author, be merely pulled, this truth having become apparent through the labors of Rosenau, Billings, Hartzell and others. By the same token it is unwise to treat the root canals in the expectation of disinfecting them. Dead dentin is analogous to dead bone, but unlike the latter does not spontaneously detach itself by sequestrum formation. Removal, however, does not become imperative until the cementum loses its pericemental attachment. In theory it may be possible up to this juncture to disinfect dead roots but we know little as to the actual percentage of cases in which all pulp tissue is removed and the dentin tubuli and root apex completely sealed. The success of these procedures is bound up in the behavior of the filling material, for a certain amount of con-



traction of the latter seems inevitable in the course of time. The author believes that in trying to disinfect dead roots we are working against the chances. These teeth must always be regarded with suspicion and hence carefully studied for the appearance of active symptoms. Neither the absence of discomfort nor negative radiograms nor good condition of the gum can absolutely decide the condition of the roots as long as the subject presents symptoms usually summed up under "rheumatism," "neurasthenia," etc. In infected roots the bone usually participates and it is precisely this fact that renders mere extraction insufficient. In theory curetting the socket might answer to complete the extraction, but in practice this is not only highly inefficient but actually dangerous; since it tends to carry the infection into the antrum, inferior dental canal, etc. The operation to perform consists in cutting through the alveolus with a chisel and having removed the bone to lift out the root, everything being under the eye control. Even loose teeth should never be merely pulled in pyorrhea cases. The exact amount of diseased bone can then be determined and removed.

**A Stovaine-Antipyrin Analgesic Association.** Losada Argibay. *La Odontologia*, November-December, 1919, xxvi, Nos. 11-12.

The author who is physician-dentist to the military garrison at Granada, Spain, recommends highly the following solution for local anesthesia in oral surgery; stovaine, 1 gm.; antipyrin, 2 gm.; solution of adrenaline 1-1000, 100 drops; distilled water 100 gm. Antipyrin powerfully reinforces the action of stovaine. The period of latency between the injection and the first appearance of analgesia is shortened and the emotive shock lessened. The author neglects to quote any cases and is silent on statistics, so that his recommendations receive no practical support for the guidance of the reader.

**Phosphorus Necrosis.** Zilz. *Wiener Vierteljahresschrift für Zahnheilkunde*, October, 1919, xxxv, No. 4.

Prophylaxis directed against phosphorus necrosis in match makers and other artisans now goes back 65 years. At present in England these workers are under regular supervision by dentists and are compelled in self protection to report to the latter whenever they present either toothache or swelling of the jaw. Periodical examinations are made monthly. In the University of Milan there is a chair on occupational diseases under Professor Devoto and under this aegis Vallardi has published a complete monograph on phosphorus industrial poisoning. Of recent years considerable x-ray work has been done in this field. The comparative rarity of phosphorus necrosis appears from the fact that Stieda in 11 years service as physician in a phosphorus factory publishes but two cases in detail. Among the authorities quoted by the author are no names of dentists, stomatologists or oral surgeons, whence it is inferred that the condition is very seldom encountered in dental practice. The author reports a case as follows: the patient had worked in a phosphorus factory as a boy and youth and at 21 left his occupation for the first time to perform his two years military service after which he resumed his occupation. He had always been well and free from toothache until suddenly he noted that four upper teeth were loose.

He was then mobilized at the beginning of the war and as the teeth interfered with mastication they were promptly removed. This act was followed by periostitis with discharge of pus from the alveoli at the area of extraction. Dead bone soon came away in pieces and the cheek became so swollen that the eye was nearly closed. Incision of the soft parts brought away pus and in a short time all of the remaining upper and several of the lower teeth became loose. The superior maxilla and part of the mandible on the right side appeared to be badly diseased with persistence of a fistulous opening under the right eye. The bones were the seat of much osteophytic thickening. The necrotic bone with the involved teeth was extirpated but the patient died of sepsis.

**Present Day Plastic Operations on the Face.** Gillies. *Journal of the National Dental Association*, January, 1920, vii, No. 1.

From this long article we only quote the author on whole face reconstruction. Few so extensively wounded as to necessitate this intervention survive. It is otherwise with extensive burns which are not incompatible with survival. Possibilities here are limited only by the requisite flaps, for if unlimited flap material can be supplied there is no limit to restitution. Hence if the chest and neck are not involved in the burn there will be enough flap. The best course is to repair one half of the face at a time. Part of the flap is swung up from the chest and the balance from the neck. As a rule the chin is supplied from the chest while from the neck flap are reconstructed the cheek and nose. The writer lays much stress on the tubed pedicle devised by him. No case thus treated has satisfied him completely, but the degree of improvement has been enormous.

**Semeiological Value of Leucoplasia Buccalis.** Malherbe. *Revue Trimestrielle Belge de Stomatologie*, September, 1919, xvii, No. 2.

The author who is a practising physician at Nantes does not write from the dental viewpoint and his article is devoted largely to a single case in a woman who consulted him for anovulvar pruritus, with leucoplasia-like lesions which may have been the cause or effect of the pruritus. The perianal region was much more involved than the vulva and the author decided that the lesions were artifacts due to intensive scratching. The cause, or one of the causes, may have been a leucorrheal discharge dating from a miscarriage 6 months before. The author sought first to exclude syphilis and on examination of the mouth found extensive leucoplasia, the presence of which seems to have been unknown to the patient. A colleague who had seen the patient had made a diagnosis of buccal and anovulvar syphilides and the patient herself was convinced of this and came in reality for a course of injections. Careful examination and interrogation failed, however, to discover any evidence of the malady. The miscarriage could be accounted for on other grounds and the woman was the mother of three healthy children. The vulvoanal lesions were certainly nonspecific. There was no cause apparent for the buccal lesions and the author, despite his diagnosis, is forced to think of a possible congenital transmission of the taint expressed as the buccal manifestation only, other stigmata being absent. Unfortunately there is no mention of a Wassermann test.

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## EDITORIALS

### The Necessity for More Careful Technic in Working Plaster

PLASTER of Paris and similar materials for the taking of impressions and making of models form a very important part in the practice of dentistry and especially orthodontia, yet, there is nothing that receives so little consideration in the hands of the average practitioner as the technic of manipulating plaster. How long this substance has been employed by the dental profession could only be determined by going back into the history of dentistry a great distance, but it is safe to say that improvement in technic has been very slow, in fact little advance has been made within the memory of the older practitioners. It is true that different investment compounds and cast materials have been produced since attention has been called to the shortcomings of some of the materials, but even in the face of the elaborate instructions by the manufacturers the dental profession has not taken time to master the technic required for their successful use. The profession has been more interested in short cuts, than in following a definite technic that would give the same result each time.

Plaster of Paris and similar materials have been employed in arts and crafts for many years and date back to the history of the ancient nations. Some of the best technical skill in the use of plaster is found in the manufacture of cheap plaster art work. Dentists have not given the proper time necessary to master the working of these materials, and consequently operations involving the use of plaster have suffered and in many instances results have been unsatisfactory.

Considering the use of plaster as impression material, the majority of the dental profession seem to think it is unpleasant, disagreeable and uncomfortable to the patient and difficult for the operator to use. Practically all of these objections, both from the standpoint of the patient and operator, will disappear when one has mastered the technic. The first requisite to success is familiarity with the material to be used, knowledge of the rapidity with which it sets, and the thickness of the mix required to give the most satisfactory impression. One must also know the condition of the tissues in the mouth, for the mix of plaster that might be indicated in one operation would result in a failure in another. The physical properties of the material must be well understood to enable the operator to obtain the impression in the shortest possible time and thereby eliminate a great amount of the unpleasant results that occur when impressions are allowed to remain in the mouth over a longer period than is necessary.

Mixing of plaster is one technical procedure which dentists have almost universally neglected to grasp. They have failed to make a mix that is free from bubbles and that presents a smooth consistence. Desirable results cannot be obtained by carelessly throwing a lot of plaster into water and then giving it a few stirs to mash the lumps. Neither can results be obtained by pouring a quantity of water into the plaster and then giving it a few whips with the spatula. In other words, the average man does not consider plaster of sufficient importance to become familiar with; when, as a matter of fact, a good plaster impression will often be the dividing line between success and failure. Those who have given thought to this subject know that there is no material that will make so satisfactory an impression in orthodontia or in the majority of dental operations as will plaster.

Plaster and associated materials, when used in making a model, also require a definite technic. When used in the making of a cast it must be so mixed and placed in the impression as to avoid air bubbles. In the use of investment compounds in the making of inlays and castings, we have been told that one of the greatest sources of failure is the developing, or rather occurrence of bubbles in the material during the time it is being mixed; this could be entirely avoided by mastering the technic of manipulating the material. In pouring models over which castings are made, bubbles will appear in the model unless precautions have been taken to prevent them.

The accuracy required in orthodontic work cannot be obtained with any other material than plaster, regardless of the great desire of some to use a material requiring less time. After a good impression has been secured, the operator must also have mastered the technical procedure for varnishing the impression so as to produce a first class model. Then the model-plaster must be properly



mixed and placed in the impression in such a manner as to avoid bubbles. A good model can only be obtained by following a definite technic.

It has been our good fortune to attend postgraduate courses given by Dr. Hall and Dr. Roach, and to observe the careful technic they follow in the use of the impression and model materials. Many of their excellent results are obtained through the skill with which they use the materials. When we observe the careless manner with which their students manipulate the same materials, it is easy to see that the student will never equal the master until he practices the same definite technic. From experience in postgraduate work in orthodontia, we are convinced that the average orthodontist does not know how to work plaster. Unfortunately, after they have had instruction in the proper use of these materials, we find a great many still using inferior materials. Many unsatisfactory results develop in dental operations because of this negligence on the part of the operator. There is no one thing that will give a greater return than a more careful technic in the use of plaster and associated materials.

## ORTHODONTIC NEWS AND NOTES

The editors desire to make this department a permanent feature of the Journal, but in order to do so must have the full support of the orthodontic profession throughout the country. We would deem it a great favor if our subscribers and readers would send in such announcements as might be of interest to the profession.

### Erratum

We have received a communication from Dr. F. H. Berry, a Dentist of Milwaukee, informing us that he is not the Dr. Berry connected with Feder-spiel's Dental Polyclinic. The doctor we refer to is Dr. John Jackson Berry, a graduate of, and for several years an instructor at, Washington University Dental School.

### Notes of Interest

Dr. William W. Woodbury announces the resumption of his practice at 17 $\frac{3}{4}$  Spring Garden Road, Halifax, N. Y. Orthodontia exclusively.

Dr. H. B. Tileston, Jr., announces the removal of his office to suite 719-720 Starks Building, Louisville, Ky. Practice limited to orthodontia exclusively.

Dr. A. LeRoy Johnson announces the removal of his office to 125 Marlborough Street, Boston.

Dr. A. W. McClelland of Montreal, has moved his office from Birks Building to suite 606 Drummond Building. Practice limited to orthodontia.

Dr. Walter S. Watson announces the removal of his Brooklyn office to 98 Fort Greene Place, Brooklyn, New York. Practice limited to orthodontia. New York office, 576 Fifth Avenue, Monday, Thursday and Saturday.

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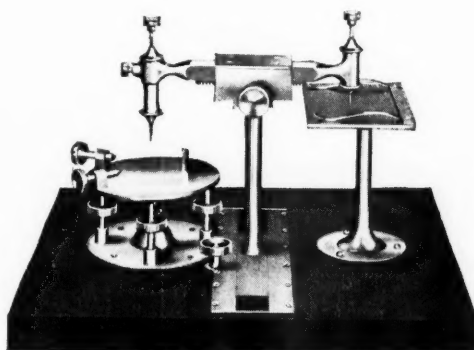


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